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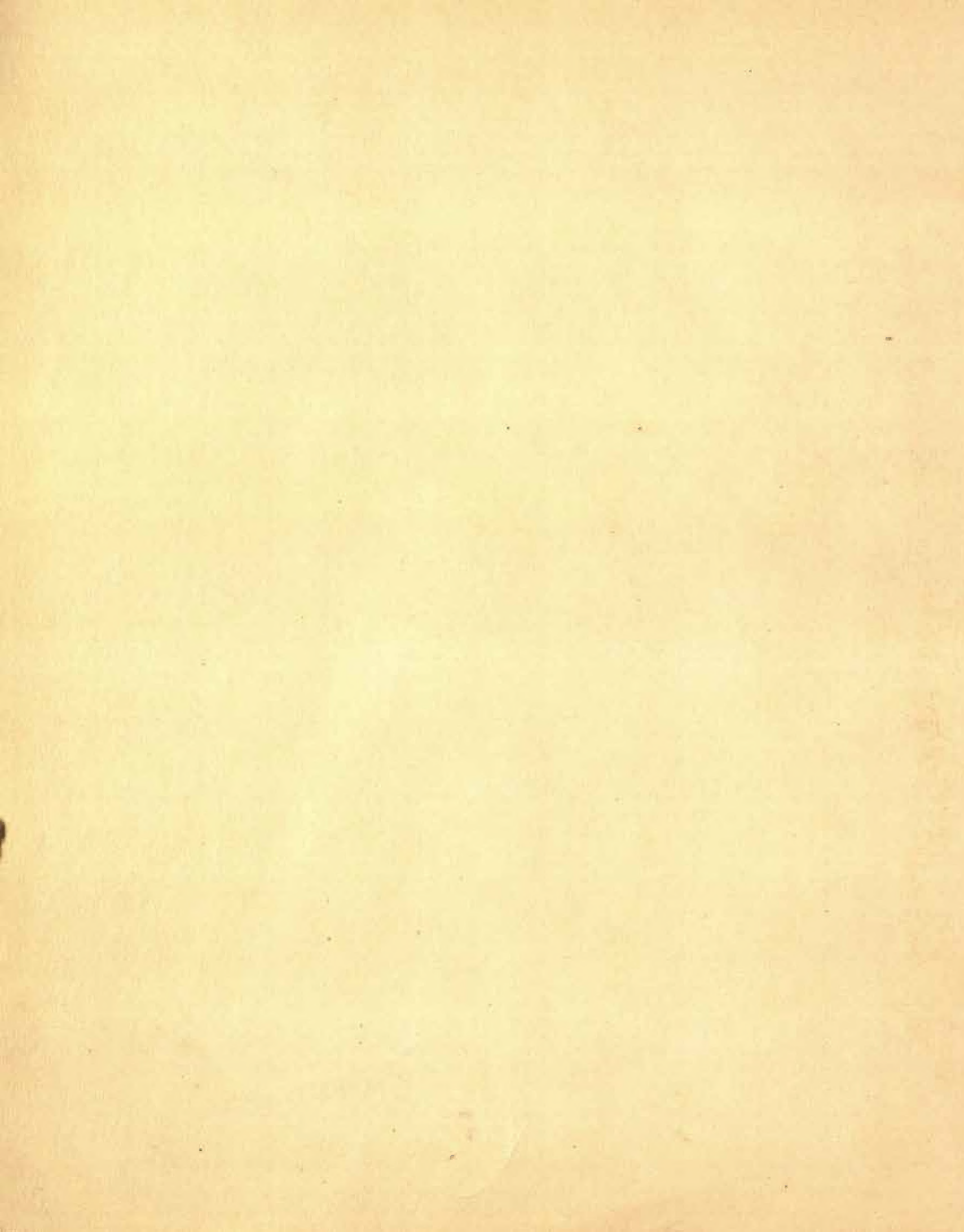
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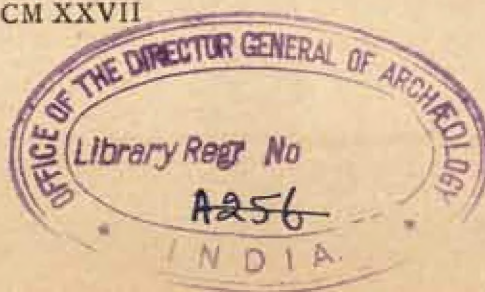
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I.—*Prehistoric and Roman Settlements on Park Brow.* By GARNET R. WOLSELEY, Esq., A.R.W.A., REGINALD A. SMITH, Esq., F.S.A., and Lt.-Col. WILLIAM HAWLEY, F.S.A.

Read 18th February 1926

I. DESCRIPTION OF THE SITES EXCAVATED

By GARNET R. WOLSELEY, Esq., A.R.W.A.

IN a paper describing the discovery and partial excavation of an Early Iron Age settlement on Park Brow Hill near Cissbury, published in the *Antiquaries Journal*, vol. iv, mention was made of the location of two other habitation sites on the hill—one Roman, and another probably occupied during the Bronze Age of Britain. It was to this latter site that I decided to attend in 1924, the object being to examine the relation between this settlement and that attributed to the Hallstatt-La Tène I period found on the top of the hill (see fig. A). The new site consists of a series of disturbed areas roughly circular, and lying on the slope of the hill facing south-west, about a furlong from the Hallstatt settlement (see fig. B).

One of these disturbed circles had already been partly excavated by Mr. Pullen-Burry before he left Sussex. He found that a level chalk floor had been sunk into the hill-side, but with the exception of a large decorated pottery fragment which had belonged to a bowl very like fig. 2, no antiquities had been found. My preliminary inspection of the site showed that these disturbed areas had been honeycombed by rabbits, and thus rendered visible, but spoilt for excavation. The Hallstatt settlement, however, had had no surface indications and it was decided to search for undisturbed areas round the visible sites. Success quickly came, and the turf and soil were removed down to the solid chalk over a Bronze Age area 28 ft. square. This revealed a large circular floor sunk horizontally in the chalk, although the hill-side slopes considerably hereabouts (see fig. c and section). The diameter was approximately 22 ft., and cut into it, as well as just outside on the southern slope of the hill, were found thirty-four small pits. Those on the floor were dotted about in no apparent order and varied in size from 8 in. across and 12 in. deep to 2½ ft. in diameter and 2 ft. in depth (no. 4 on fig. c). The excavation of these pits and of the floor yielded a considerable number of antiquities. Some of the

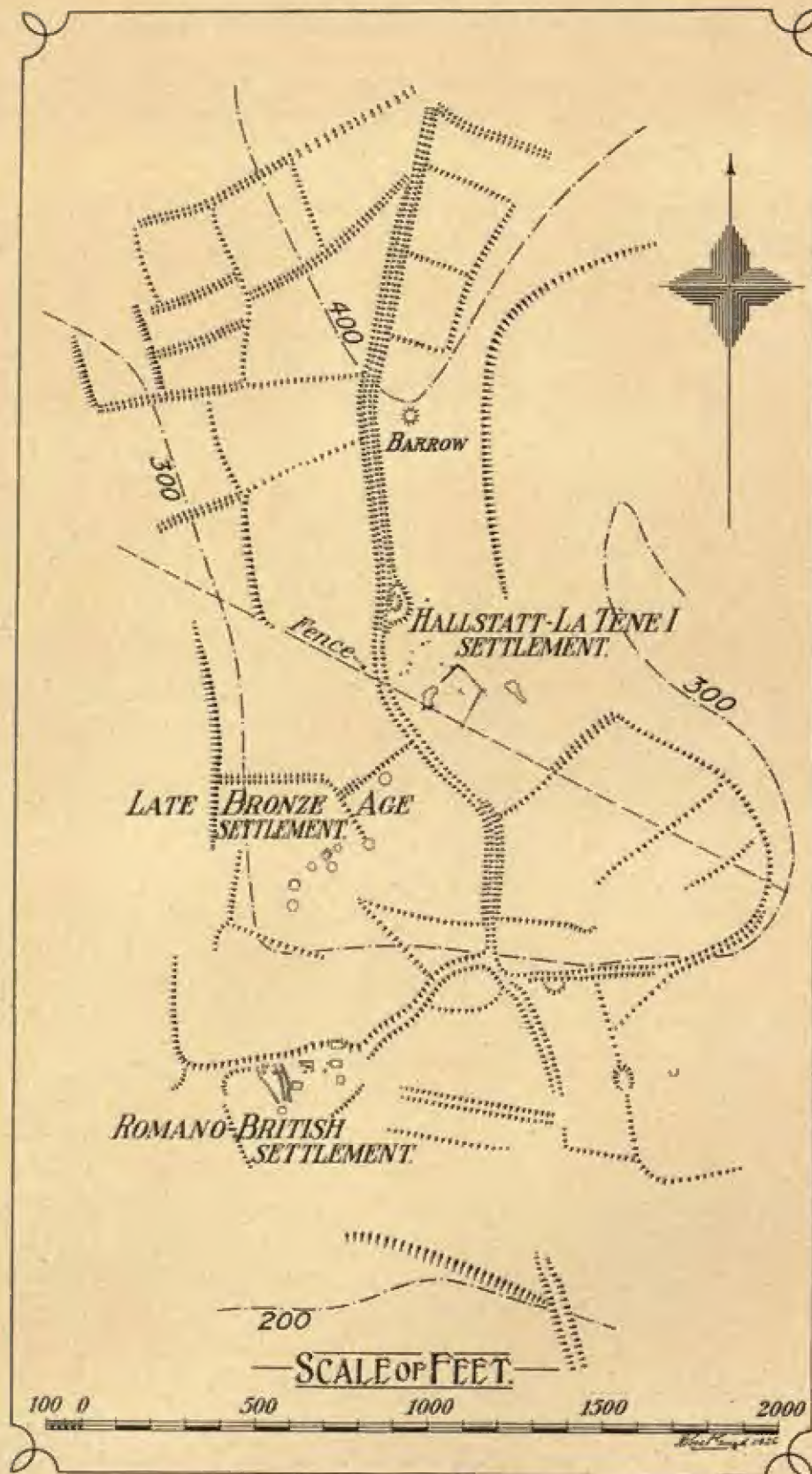


Fig. A. Plan of Park Brow near Cissbury, Sussex, showing sites of excavations.

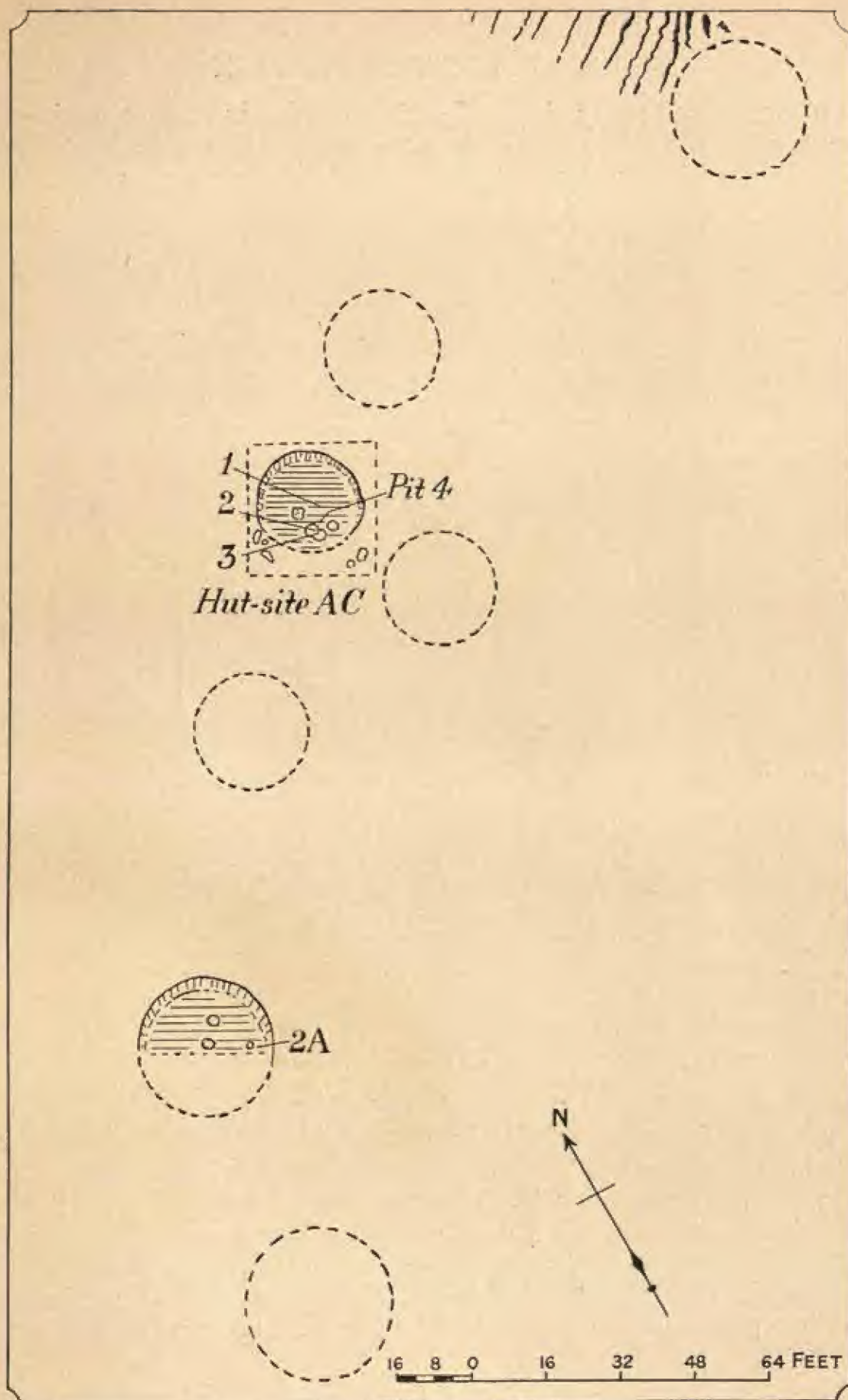


Fig. a. Hut-sites of the Late Bronze Age settlement, Park Brow, where pottery (figs. 1-3) was found.

smaller pits contained many pieces of daub, on which were seen marks of the wattles; some of the sticks had been round (about 1 in. in diameter), others were larger and had been square, some of the daub showing smooth flattened

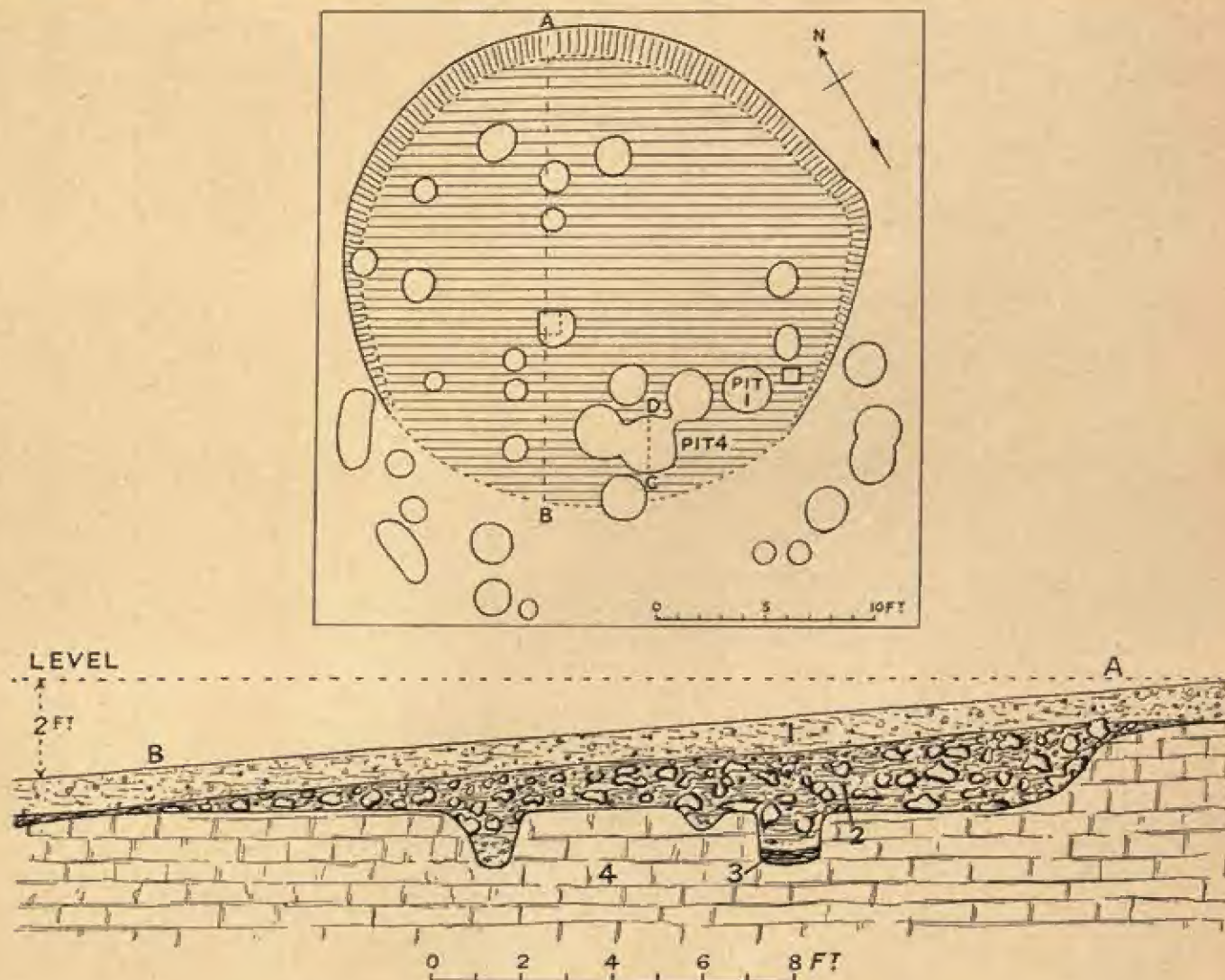


Fig. c. Detailed plan and section of hut-site and pits, Bronze Age settlement.
 1. Surface soil. 2. Flints and chalk rubble.
 3. Black soil. 4. Solid chalk.

surfaces. Most of the pits contained fragments of saddle-querns, several of the pieces being about two-thirds of the complete stone. They averaged 14 in. in length, 7 in. in width, and 4 in. in depth, and were very heavy, the upper surface being slightly concave and roughened. Among other antiquities found were the spindle-whorl and portions of almost cylindrical loom-weights of baked clay (fig. d). One piece of loom-weight was found at the bottom of a pit; other pieces, together with the spindle-whorl, occurred on the hut-floor.

Many charred and split bones of domestic and other animals came to light, including ox, pig, small-horned sheep, deer, and wild boar. The shells found were mussels, and four varieties of snails (*Helix nemoralis*, *elegans*, *itala*, and *lapicida*). Of worked flints, other than a few flakes and hammer-stones, no trace was found, while cooking-stones, so abundant on the Hallstatt site, were scarce. Many large flints had been spread over the excavated area below the surface soil, and their presence may well have prevented disturbance by rabbits. No

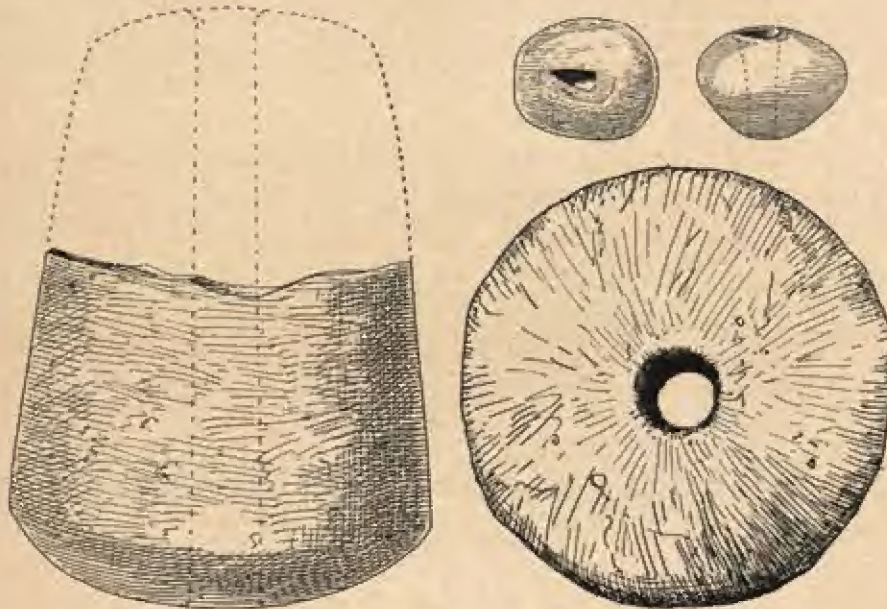


Fig. D. Pottery loom-weight and spindle-whorl, Bronze Age settlement, Park Brow (British Museum). (3)

trace of any metal was found, and it must be noted that while in the surface soil all over the area, to a depth of about 9 in., fragments of Roman, La Tène, and typical Hallstatt burnished pottery occurred, no trace whatever of these wares was found below this level. In the pits, and on the floor, a quantity of broken pottery was collected, the largest pit containing a mass of sherds which proved to be the remains of two vessels now restored (figs. 2 and 3). Fragments of fig. 2 were also found scattered over part of the floor, and had been burned to a red colour as in an accidental fire, while those belonging to them in the pit were black. The fragments of four other similarly decorated two-handled bowls were found, one (fig. 2A) being smaller than fig. 2. Fig. 1 was found as a mass of sherds lying on the floor near pit 4 on the plan—some pieces were also found in the pit (fig. E). Fragments belonging to about ten other vessels very similar to figs. 1 and 3 were found, all with the raised band and four with holes around the rim. The band was generally ornamented with finger-tip decoration, but was sometimes left plain. Traces of any but the two

types exhibited from this site were of the slightest. The raised bands so commonly found on pottery vessels here, always a little below the rim, were probably evolved to keep in place a rope or thong to which the handles were attached: without this provision a vessel such as fig. 3 would be very awkward to carry. In the general filling of the pits were found many large flints, bones of domestic animals, teeth, and black soil—though the last was by no means always present. Some of these pits were no doubt post-holes for roof-supports—others

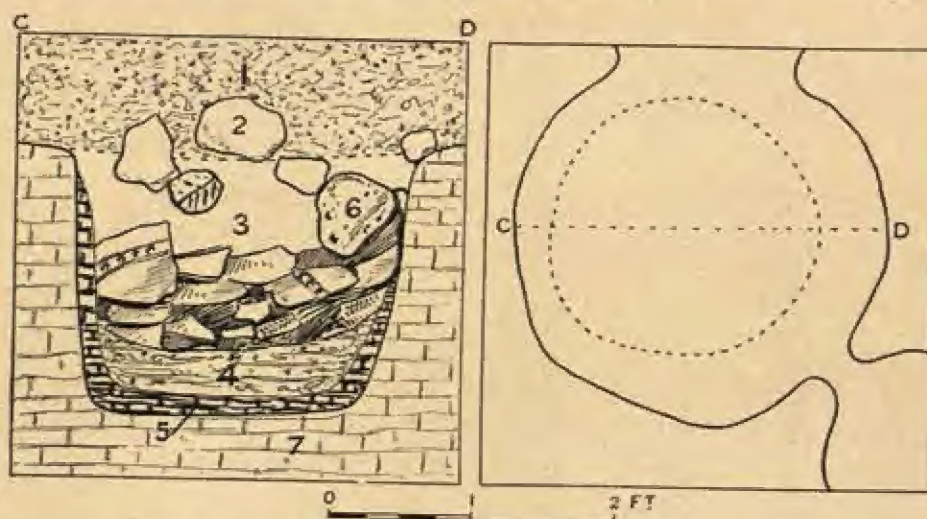


Fig. 7. Section and plan of Pit 4 (see fig. c), Park Brow.
 1. Surface soil. 2. Flints. 3. Black earth.
 4. Chalk rubble. 5. Rammed chalk. 6. Pottery.
 7. Solid chalk.

may have been used for cooking or for storing pottery vessels such as fig. 3; they could be let down by their rope handles, and this would perhaps account for the curiously elongated shape of these vessels. From the above it will be seen that the sunk floor belonged to a circular wattle-and-daub hut, being one of a series of seven which formed a hamlet. The roof would be supported by a stout central post, from the top of which posts radiated to the edge of the floor: withes were then closely woven horizontally in and out of these supports, and the whole thickly plastered with daub and finally thatched. A glance at fig. c will show an interesting absence of pits from the north-east part of the hut floor: this area may have been the sleeping quarters of the establishment, as the sloping chalk wall hereabouts forms a comfortable support. The examination of this living-floor completed the work for 1924.

In the following season, before Col. Hawley's arrival, I attempted to fill the gap in time between the hill-top settlement, where no pottery later than La Tène I had been found, and the Roman homestead first discovered, and dated about the second century. That the hill was occupied during this period of

about five hundred years was indicated by pottery fragments of La Tène II and III on the surface. In the absence of any other visible signs a series of examination holes was dug over much of the southern slope of the hill, but without result, the natural chalk being always met with at the normal depth of 10 in. After working down the hill it was found that the Roman site had been occupied for at least three hundred years before the coming of the Romans. It will be seen from the accompanying fig. F that some eight pre-Roman pits have been located here, together with several shallow trenches. In addition there was the Roman-Celtic trench (fig. F), which averaged 4 ft. deep by 3 ft. wide. The lower two feet contained exclusively pre-Roman pottery, always hand-made: typical specimens are here illustrated (figs. 16 to 25). Above this two-foot level, and beneath the surface soil, this Celtic pottery became Romanized (see section A-B). The native potters, apparently undisturbed by the coming of the Romans, retained the Celtic form of their pots, but there was a change in the paste; the Romans taught a new way of preparing the clay, and utilized the potter's wheel. These earliest attempts of the native potters to produce Roman pottery were at first not very successful, the ware being very soft (figs. 26-30). Of objects other than pottery this trench yielded few, but in the Celtic zone was found a human jaw and numerous bones of domestic animals, and in the Roman section a bronze brooch and a bone arrow-head. It must further be noted that oyster and edible snail-shells occurred in this trench for the first time on the hill, but these shells were entirely confined to the Roman part of the trench, mussels and the snail (*Helix nemoralis*) being the only varieties of shells below the Roman horizon. This suggests that the Romans introduced the oyster and the edible snail as food among the natives of South Britain, and supports Mr. Toms's contention that the oyster was introduced by the Romans (*Sussex Archaeological Collections*, lxxvii, 79).

Three of the eight Celtic pits found in this area contained chiefly the remains of saucepan-like vessels similar in type to fig. 13, and it is here that the 'swag' ornament first appears (figs. 13-15). No trace of this distinctive type of vessel was found in the Roman and Celtic trench above described, nor was it in evidence in the Hallstatt-La Tène I site. For the rest, all these Celtic pits and trenches contained fragments of daub and numerous bones of the usual domestic animals, and in one of them was the nearly complete skull of an ox, whose horns had been sawn off.

The restored vessel fig. 10 was found in one of the small pits here. The similarity of ware between this pot and fig. 8 from the Hallstatt site above can, I think, be easily seen. When I mention that with this fig. 10 pot was found the pedestal base fig. 10A, also very like one found in the Hallstatt village (10B) a close connexion is obvious between the two sites, and it seems extremely likely

that the hill-top villagers, when they left their village, about 400 B.C., merely migrated to the foot of the hill, where their descendants continued to live for many centuries.

The purely Roman features of this site are easily distinguished. Beside the five distinct house sites and the trench, there have been found a drainage pit and two other long trenches. The pit contained much broken pottery and bones. The position of the trenches may be seen on plan F, and the Roman trench no. 1 has been almost completely excavated. It had been used obviously as a dump for rubbish by the occupants of the adjoining farmstead—masses of oyster and edible snail-shells were found, together with the bones of immature animals, especially small pigs and sheep. Several dumps of cockle-shells, the remains of an old pony's skull with much worn teeth, the neck of a large amphora, fragments of Samian and other Roman pottery were found here. I have been able to restore several vessels from these fragments (figs. 31-36).

The Roman homesteads would appear to have formed a hamlet of farmers, no trace of anything in the nature of a villa having been discovered. House-site AA, on fig. F, was typical of the rest. The quite recent discovery of this site was entirely due to my following the sagacious advice of Col. Hawley, who advised me to examine the bank which forms the northern boundary of the Roman and British site. Digging here, I found that the floor of a house had been cut partially into the bank. The walls, in common with the other houses, had been constructed entirely of wattle-and-daub, no trace whatever of any flint or stone foundations being discoverable. The roof, which had been supported on stout posts let into holes cut in the solid chalk, had been covered with ordinary Roman roofing-tiles fixed with iron nails, many of the latter being found. This house like the others had been burnt down, and much burnt oak, mixed with masses of blackened daub, lay just beneath the turf. The inner surface of this daub had been tooled to receive a coating of plaster, which in turn was covered with red paint or distemper. The door-key, found and exhibited, bears witness to a substantial well-locked door, and fragments of window-glass suggest some degree of comfort. No trace of any flooring remained above the flattened chalk.

Other things found during the partial excavation of this site comprised quite a lot of thin broken sheet bronze, and three coins, including a first brass of Antoninus Pius. A good deal of pottery, all very much broken, was found lying on the floor. From these fragments I have been able to restore four vessels (figs. 38-41), and as the pieces were all found together these pots are contemporary, and give an excellent idea of the very fine quality of the domestic ware in use in a poor man's house at the height of the Roman power in Britain.

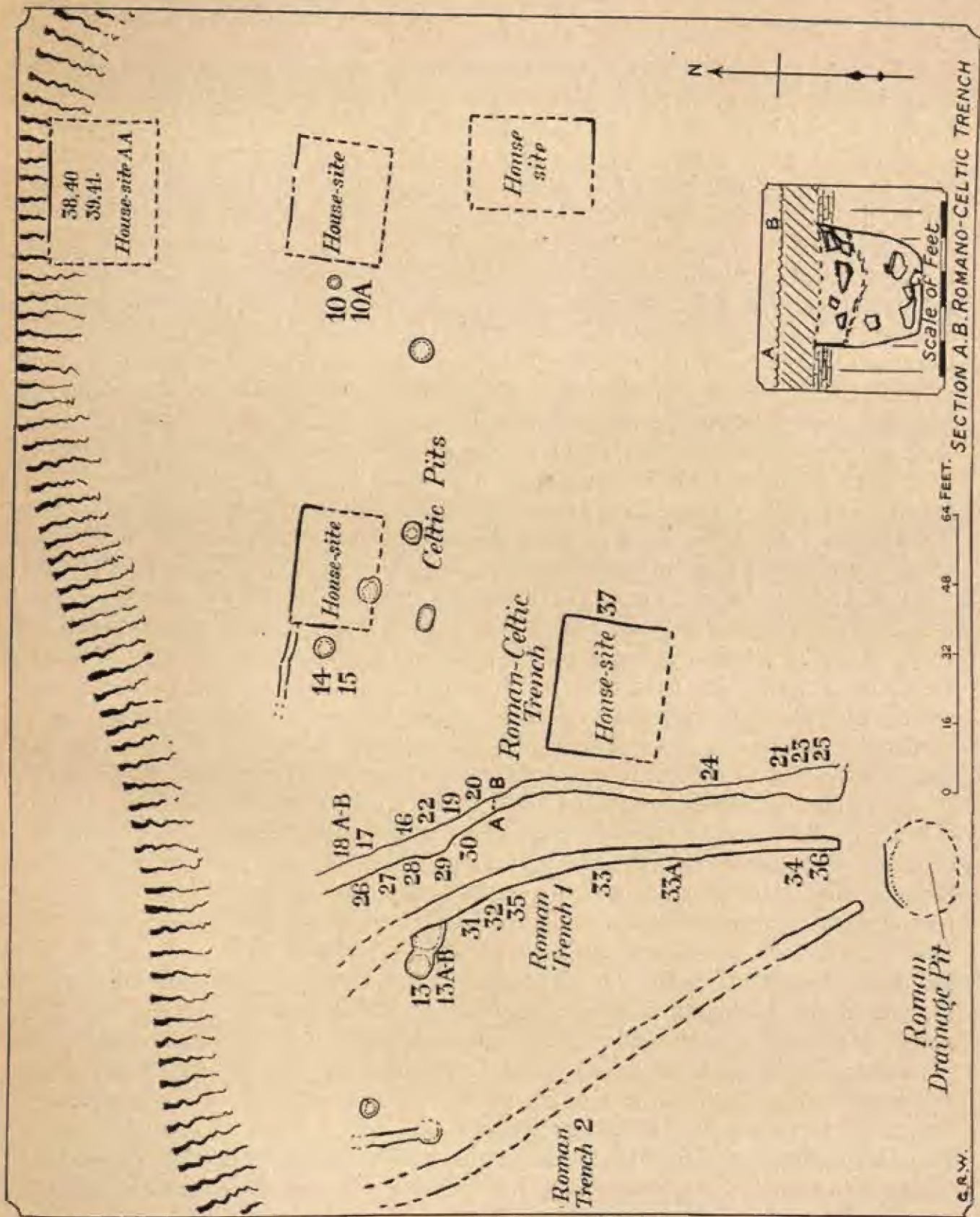


Fig. v. Plan of Roman houses and trenches, Park Brow, with sites of pottery (figs. 10-41).

Finally, I should like to sum up the points which seem to me to emerge from a study of the antiquities discovered on this typical downland hill. The finding of flint implements and many flakes on the surface suggests a Stone Age occupation. That the manufacture and use of these implements of flint had already ceased during the Late Bronze Age is also indicated by the fact that no implements—and only quite isolated flakes—have been found during the excavation of any of the settlements. The discovery also of Beaker ware in the surface-levels testifies to the presence here of the Early Bronze Age people. At the close of the Bronze Age an agricultural community is found to have lived on the south-western slope of the hill. These people had reached a comparatively high level of culture—it appears, indeed, to have been as high as anything existing afterwards until the Romans brought about such a remarkable improvement in the condition of these hill-dwellers. The Late Bronze Age people knew how to spin and weave; they had many domestic animals, and grew corn around their village; which, I think, tells us that some of the lynchets or cultivation terraces found on this and the neighbouring hills must date at least from the Late Bronze Age. The development of these people suddenly ceased; they must have been destroyed or driven away by the continental invaders who formed the hill-top settlement about 700–600 B.C. The new-comers show no trace of any amalgamation with the natives they found on their arrival. Their art, as typified by their pottery—and nothing is more eloquent of nationality than art—tells us that they belonged to a very different race. There seems to me to be a profound difference of mentality and race shown by such vessels as figs. 3 and 6. Further, the form of their huts, as revealed by Col. Hawley's recent excavations, is seen to be completely different from the circular dwellings found on the Late Bronze Age site, and this applies equally to the remains of ancient spinning and weaving appliances discovered (fig. D). When, on the other hand, the long series of pottery vessels beginning in Hallstatt times is studied, a remarkably strong family likeness is seen to persist throughout: again and again the graceful double curve is repeated, and vessels figs. 6, 17, and 26 show it to perfection. I have searched in vain for this curve in any pottery vessel found in England of a date previous to the arrival of the Hallstatt people, and I suggest with some confidence that this series of vessels, covering the whole of the Early Iron Age, was made by people of essentially the same nationality. Now it is known that the natives found in the south of England by the Roman invaders were Celts; and when, in addition to the remarkable similarity of pottery forms noted above, it is further found that the distinctive triangular loom-weights which commonly occur on definitely Celtic sites, such as Glastonbury, have also been found associated with the very earliest Hallstatt pottery from Park Brow, it may be assumed that the

whole of this Early Iron Age pottery is Celtic, and the Hallstatt invaders of 700-600 B.C. were the earliest Celtic people to reach these islands, or at least the south of England; their arrival may mark the beginning of the Iron Age here.

On Park Brow the Celts first appeared in Hallstatt times, and their descendants occupied the two later settlements for 800 years, as a Celtic



Fig. 6. Loom-weight (grooved angle below), bone needle, and spindle-whorls, with La Tène I brooch of iron, Findon Park site. (1/2)



Fig. 11. Pottery spindle-whorl, Hallstatt period, Park Brow. (1/2)



Fig. 1. Silver bent-ring (Brit. Mus.) (1/2) and bone lance-head, La Tène period, Park Brow. (1/2)

occupation continued to the end of the Roman period. In pre-Roman days there may well have been new arrivals, pottery vessels such as fig. 14 certainly showing new influences, but even vessels of this distinctive type are seen, by reason of their typically Celtic decoration, to belong to the same great family as the others. These new features on the south coast may be due to the extensive trade which we know existed between Britain and the Continent in pre-Roman days. Another explanation would be the arrival of new peoples, and perhaps violent attacks, from the Continent, but the new-comers, being also of Celtic extraction, and speaking much the same language, would quickly fraternize, the pottery &c. indicating little disturbance. An additional argument in favour of the peaceful character of this long Celtic period is the fact that practically no weapons of war have been found on the Celtic sites examined here, not to mention the conspicuous absence of any defensive earthworks around the settlements.

It may be argued that the archaeological evidence in favour of such an early Celtic invasion of the south coast is too scanty, and more evidence of it should have come to light. But may not negative evidence in this matter be exceedingly misleading? Is it not very unlikely that the Hallstatt people, definitely known to have formed a small settlement on Park Brow about 600 B. C., came almost alone? They were strangers in a strange country inhabited



Fig. K. Iron ring-headed pin, with side view, Park Brow (Brit. Mus). (1/2)



Fig. L. Bronze brooch, Roman period, Park Brow. (1/2)

presumably by natives hostile to the intruders. It would seem that, for safety's sake, they must have come over in considerable numbers. In this connexion it may be recalled that relics of these earliest Celts have already been found over a significantly wide area in the south of England—Hengistbury Head, All Cannings Cross in Wiltshire, Park Brow, Eastbourne, and recently Buckland Bank near Brighton, have all yielded definite traces of these people.

May I also emphasize the very great difficulty in detecting these early Celtic sites? Defensive or other earthworks being nearly always absent, the settlements, after many long centuries of ploughing, have become hopelessly obliterated—indeed, it is only quite exceptional circumstances, such as a very shallow subsoil together with the presence of rabbits and moles, which gives the most trained eye a chance of detecting them. In order the more fully to test this matter of hidden settlements, I recently examined the hills around Park Brow for further possible sites. The result was certainly illuminating, for I found that the southern slopes of two hills lying to the westward had also been occupied by these same early Celtic people. Of surface indications of these new settlements, apart from the lynchets so commonly found on the South Downs, there was none except the usual cooking-stones lying on the surface. Through the kindness of the owners of the Wiston estate, I have been enabled recently to examine with a spade one of these new sites, and found that a perfectly normal and prolific cornfield near Findon was honeycombed with pits both large and small. Two of these I have excavated and the pottery and other relics are exhibited (see pottery vessels figs. 11, 12). To judge from the pottery, this new site was occupied at the same time as the hill-top settlement on Park Brow, two miles away, and it would seem that the Celtic people on their arrival in the south of England, having first of necessity destroyed or driven away the native population, were enabled in safety to spread themselves over the South Downs, erecting their mud huts, as at Park Brow, in little settlements of four or five on those particular hill-sides which by reason of their southern aspect were found most suitable for their farming operations; and I am sure that under many a smooth grassy hill-side, and under many an

apparently commonplace field of corn, lie the buried remains of the early Celtic settlements founded when the Bronze Age in the south of England was brought to a close by the arrival of the first Celtic invaders from the Continent.

In conclusion I welcome this opportunity of expressing my gratitude to the anonymous benefactor whose generosity has rendered possible a complete examination of the Hallstatt site recently carried out by Col. Hawley, F.S.A.; to the owner of the site, Major Tristram, for his interest in the work for which he readily gave permission; and to Mr. Reginald A. Smith, F.S.A., for his help and encouragement throughout my four years' digging on Park Brow. It was in the periods of archaeological enthusiasm which were invariably caused by his visits to Sussex, that most of the best finds were made. My thanks are also due to Mr. H. S. Toms, of the Brighton Museum, for much practical help, to Dr. Curwen, F.S.A., for kindly allowing his survey of the lynchets of Park Brow to be used as a base for the general plan of the settlements, and finally to Mr. Gurd for his valuable assistance in the matter of plans.

DISCUSSION

Mr. LEEDS praised the exhibition of pottery, and had at first thought that it had been brought by people coming from the south-west, but the total absence of cordoned pottery showed that it was not of the same origin as that from Chun Castle in Cornwall.

Mr. CRAWFORD recognized two types in the earliest pottery on exhibition: both were fully represented at All Cannings Farm, and though of different fabric were contemporary. Some distinction in culture was possible, but to attribute the two classes to different peoples was hardly justified. The cylindrical urn with finger-tip ornament appeared at Hallstatt itself: it was common in Austria and the Alps, and on the Continent would be assigned to the Hallstatt period. At Park Brow he would hesitate to regard it as Bronze Age. The handled urn with fern-leaf decorations was so unusual as to afford little help in dating. The ware exhibited had a remarkable range, and the diagrams rendered the types intelligible. From a single site such a yield of pottery was of special importance.

Mr. BUSHE-FOX thought the paper extraordinarily valuable, as the pottery covered so many centuries, and he knew of only one parallel to it in the country. The Hallstatt group resembled specimens from All Cannings Cross and Hengistbury, but coast-deposits like Scarborough and Land's End always displayed minor differences, as they arrived by different routes. The silver ornament of Swiss type was significant, and the vases labelled La Tène III seemed to him to mark a new departure or interpolation, the last survival of the Marne-Aisne culture, which reached Britain before the time of Caesar. The debased cordons were more probably after than before the Christian era. Some specimens linked the La Tène and Roman periods, and Celtic influence was not suppressed by the invasion under Claudius.

The CHAIRMAN (Mr. Emery Walker) expressed the Society's indebtedness to Mr. Wolseley for his striking exhibition of pottery and the array of drawings which threw much light on its evolution and original appearance.

II. THE FINDS AND FOREIGN PARALLELS

By REGINALD A. SMITH, Esq., F.S.A.

MR. WOLSELEY'S classification of the pottery seems to harmonize all the data, and may be provisionally accepted as a working hypothesis. Numbers given to the illustrations of pottery correspond to the sites of discovery on figs. B and F. The last stage of the Bronze Age is marked by cylindrical urns (figs. 1, 3) of coarse and heavy ware, already known from the urn-field at Ashford, Middlesex, where cremation was exclusively practised. The finger-tip is here driven into an applied band of clay, at about two-thirds of the height from the bottom; and a good example from Letchworth was illustrated in the *Antiquaries Journal* (iv, 269). It is sometimes called the bucket type.

As the distinction is clear and vital at Park Brow, it may be pointed out that such indentations are not found at All Cannings Cross on a raised or added band, but generally on the shoulder itself, and occasionally on mouldings that form an essential part of the profile, or on vertical strips in relief. If the distinction can be established, it will assist the classification of such pottery finds as those at All Cannings Cross and Hengistbury Head by eliminating any Bronze Age elements; but it should be mentioned that both methods of decoration have been found on the same vessel in the Hallstatt series from Castle Hill, Scarborough.

In contrast to this plain and clumsy ware stands the remarkable two-handled vessel (fig. 2) carefully restored from fragments, which, however, cannot be called unique, as Mr. H. S. Toms found other similar fragments (fig. 2A) that did not belong to it. The nearest analogue is the Deverel-Rimbury type concentrated in a small area in Dorset¹ and used as cinerary urns; but on them the lugs are generally four in number and pierced horizontally. Here the loop-handles are inserted in holes pierced in the bulge, on a level with the horizontal zone of herring-bone incisions, the series being bisected by a single incised line. The same technique is seen on the four vertical panels reaching to the lip and linked by single lengths of fern-pattern: there is also a decided foot, ornamented with a single band of vertical slashes.

The amphora (for so this remarkable specimen may be described) is not a British type, though common in North Germany in the closing phase of the Neolithic. Upright panels of ornament extending from the bulge to the lip

¹ The type is, however, found sporadically elsewhere, e. g. at Ashford, Middlesex, and Lambourn Down, Berks. (*Arch. Journ.* lxxviii, 53), both in the British Museum.

are found in the Passage-grave pottery of Denmark;¹ and a taller vessel with two handles and horizontal fern-leaf pattern is figured in Menghin's edition of Hoernes' *Urgeschichte der bildenden Kunst* (1925), p. 763, from Jaispitz in S. Moravia; but no connexion with these remote parallels is here suggested; and the Park Brow examples at present stand alone.

Mr. Wolseley very justly compares the decoration with that of the well-known handled beaker from Appleford, Berks., but if the presumed dates of both types are accepted, it is difficult to prove any connexion between even the latest of the beakers and the close of the cremation period. It is easier to imagine a connexion with the Deverel-Rimbury group described by Lord Abercromby (*Bronze Age Pottery*, ii, 40), which is generally accepted as belonging to the Late Bronze Age, and is, moreover, found near the south coast, ninety miles west of Park Brow, Rimbury being close to Chalbury, north of Weymouth Bay.

The double name is in common use; but while the Deverel illustrations given by Abercromby are more like the amphora from Park Brow, those from Rimbury are mainly of tall cinerary urns approaching the cylinder form, with finger-tip ornament on a raised band (like figs. 1, 3) or with impressions on the shoulder direct, more in the Hallstatt manner. If, as seems probable, this globular type was derived from the Lusatian (Lausitz) culture, it must date from quite the end of the Bronze Age (Mrs. Cunningham, *All Cannings*, 22); and an invasion in Hallstatt times is supported by our Fellows Mr. Harold Peake (*Bronze Age and the Celtic World*, 129) and Mr. O. G. S. Crawford (*Antiquaries Journal*, ii, 27).

Another interesting correlation is the hard and almost flat fragment (fig. 2B) with lines of circular cavities produced by some kind of comb: it was found with the two bowls just described, and would be difficult to date apart from this association.

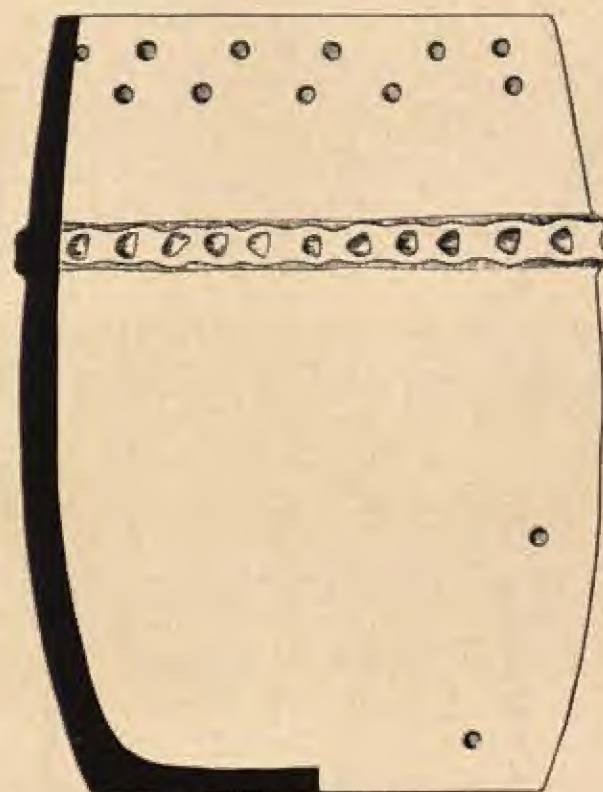


Fig. 1. Bronze Age urn restored from fragments found in and near Pit 4, Park Brow: Brit. Mus. ($\frac{1}{2}$)

¹ For example, in Madsen's *Gravhøje og Gravfund fra Stenalderen i Danmark*, pl. xxviii, cc.

An abrupt change at the end of the Bronze Age is fairly evident, and the Sussex evidence (*Antiq. Journ.*, ii, 354) points to the arrival of strangers from

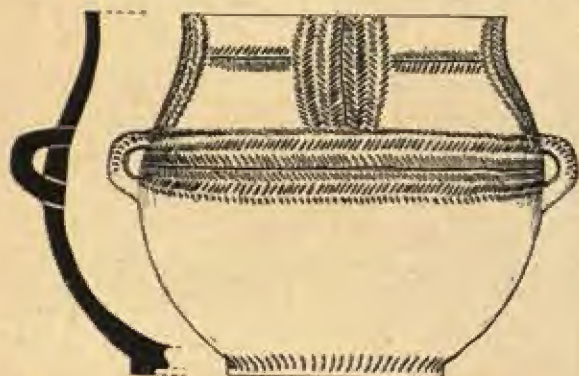


Fig. 2. Bronze Age amphora (with section), restored from fragments found among some of fig. 3, Park Brow. (1/4)

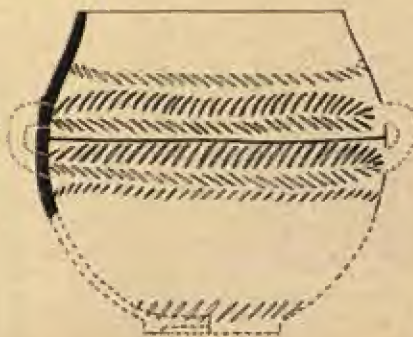


Fig. 2 A. Bronze Age amphora completed from fragments (H. S. Toms), Park Brow. (1/4)



Fig. 2 B. Bronze Age pottery fragment found with figs. 2 and 3 on Park Brow (Brit. Mus.). (1/2)



Fig. 3. Bronze Age urn found nearly complete in Pit 4, with some of fig. 2, Park Brow. (1/4)

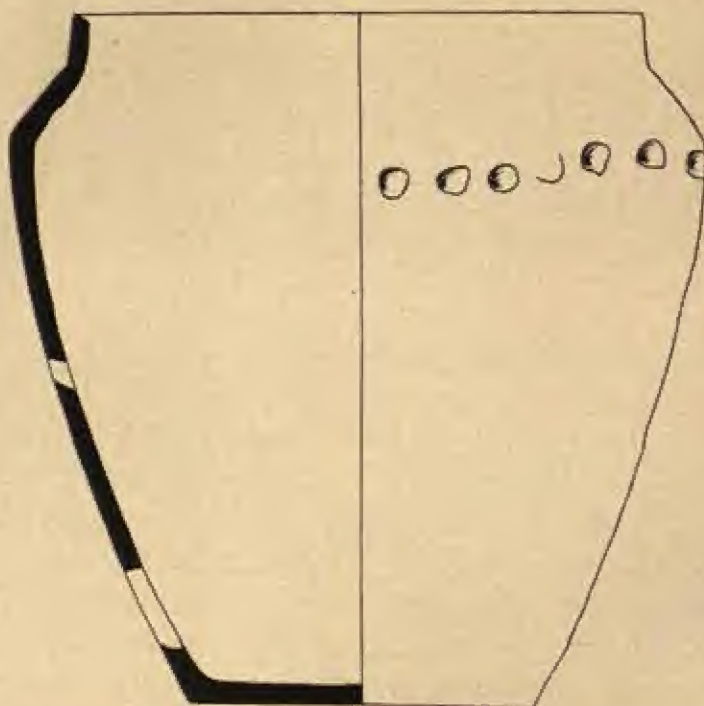


Fig. 4. Urn of hard red ware found 18 in. deep with wattle and daub, Hallstatt area on Park Brow. (1/4)

Central Europe, introducing the culture of Hallstatt. The ware attributed to the opening of the Early Iron Age is thin and hard, sometimes gritty, but often refined and also covered with a lustrous red-brown coating which perishes only too readily. Above all, the profile changes, and here as in the Celtic homeland the deep straight lip and bulging shoulder appear, with a doubly curved pro-

file (fig. 6). The best examples are comparatively delicate and have not survived in such numbers as the coarser urns which may be regarded as kitchen-ware (fig. 4). Here the bulging shoulder is retained, but the lip is not so deep, and the angle formed with the shoulder is not so pronounced. The only form of decoration consists of a row of impressions on the shoulder itself (produced with the finger-nail rather than the finger-tip), not as before on

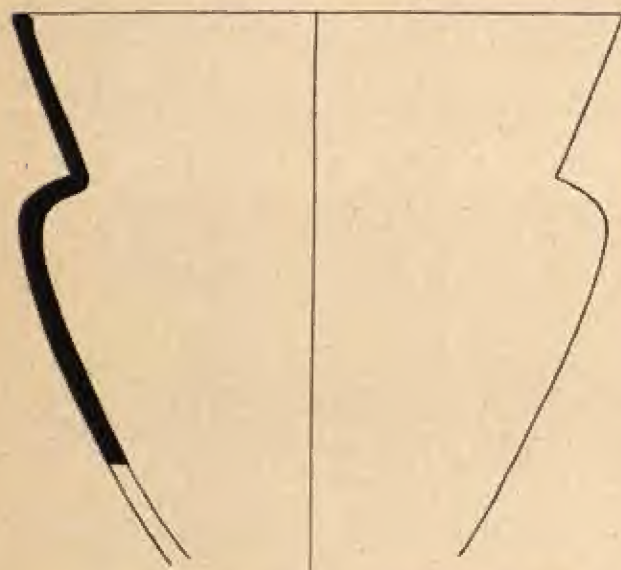


Fig. 5. Restored urn of reddish-brown ware, Hallstatt area on Park Brow (Brit. Mus.). (4)

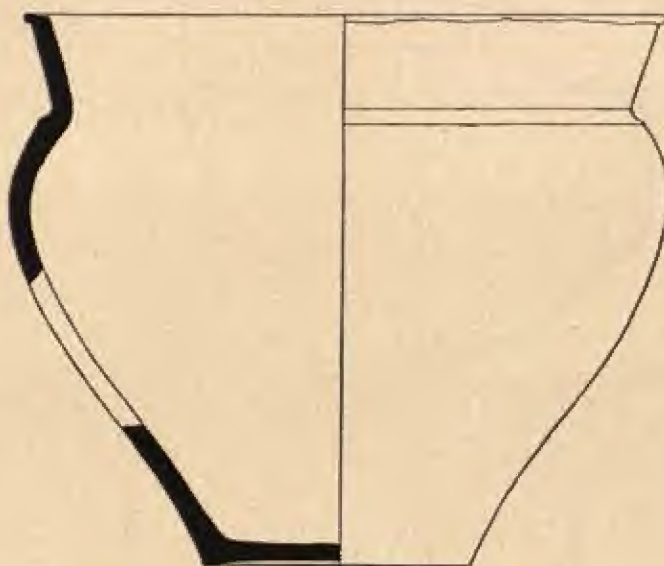


Fig. 6. Restored urn like fig. 7 in quality and colour, Hallstatt area on Park Brow. (4)

a raised band. It is this type that forms a high percentage of the series found at All Cannings Cross (Mrs. Cunningham's plates 38-40, and p. 33), and is well represented at Hengistbury Head (Mr. Bushe-Fox's *Report*, pl. xvi, figs. 10-12).

A somewhat similar distinction has been drawn by our Fellow Dr. R. C. C. Clay in a paper on the Woodminton group of barrows at Bowerchalke (*Wilt. Arch. Mag.* xliii, 313). He notes the occurrence of finger-tip and finger-nail impressions on the same urn, but mentions that applied fillets ornamented by the impression of a finger-tip retain the mark of the nail dividing the hollow. The Park Brow examples, however, show that *finger-tip* impressions have little or no trace of the nail, whereas the *finger-nail* impression shows it clearly at or near the centre. Dr. Clay further distinguishes the barrel-shaped with overhanging rim from the bucket-shaped or cylindrical urn, and gives a map of the distribution of both, with place-names under counties. He prefers to call the Deverel-Rimbury type 'globular', giving a list of finds, and noting that it has been found in association with both the bucket- and barrel-urns which are therefore contemporary; but in his opinion 'the people who employed the bucket-urns were the direct descendants of the flint-working Middle Bronze Age

dwellers in this country; whereas those who used the cinerary urns of the barrel type were fresh invaders who used no flint except for pot-boilers and strike-a-lights'. At Park Brow, on the other hand, the indigenous population made bucket-urns, with a cylindrical body and finger-tip impressions on an applied fillet; and the Hallstatt invaders introduced a fine ware with red surface, and made urns with finger-nail impressions on the shoulder line.

The distinction may not hold everywhere, and it would be natural to find

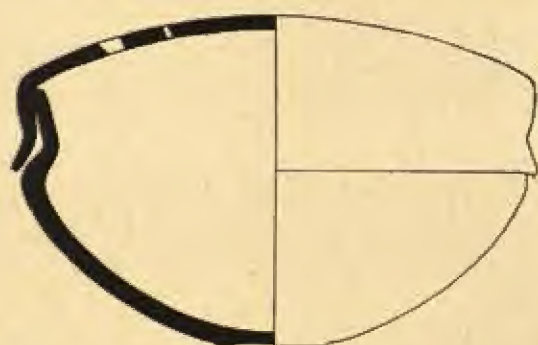


Fig. 7. Restored bowl of reddish-brown ware with cover, Hallstatt area on Park Brow (Brit. Mus.). (1)

the Bronze Age finger-tip ware associated with Hallstatt finger-nail ornament on the shoulder; but nevertheless there may be a difference of nationality in such cases. Our Fellow Mr. O. G. S. Crawford draws attention to a bucket-shaped urn with this ornament on a raised band from Platenitz in Bohemia (Pič, *Die Urnengräber Böhmens*, pl. xl, fig. 2), which is assigned to Reinecke's stages B-C of the Hallstatt period, 900-700 B.C.; and Dr. Fox gives the chief references in the *Antiquaries Journal*, vii, 125.

A more refined type is illustrated (fig. 6) in addition to a series from the same site in the *Antiquaries Journal*, iv, pp. 353-5, from which figs. 4, 5, 7 are here repeated. The delicate bowl with cover is of dark red ware, the colour corresponding to urn-fragments found by our Fellow Mr. Budgen at Eastbourne (*Antiq. Journ.* ii, 354) and thicker fragments from Margate (given by the late Dr. Rowe to the British Museum) and Castle Hill, Scarborough. The Hallstatt origin of this ware can hardly be questioned.

It is satisfactory also to obtain even a tentative classification of loom-weights. Those of the Late Bronze Age seem to have been cylindrical with central perforation, and that from Great Shefford, Berks. (*Archaeologia*, xliii, 400, fig. 92) may be chosen as a type, as it was published as long ago as 1872 and was found in a barrow near an interment with an incense-cup (*Journ. Brit. Arch. Assoc.* xxii, 450): both are now in the British Museum, with specimens of more or less similar form from Long Wittenham (Berks.), Mildenhall (Suffolk), and probably Dorset. The triangular type of loom-weight is now assigned to the Hallstatt and La Tène periods; and a specimen from an adjoining site at Findon Park is illustrated (fig. 6) with one angle worn away by trailing on the ground.

There is some evidence also for a sequence of pottery spindle-whorls, the earliest on the site being a roughly shaped lump of clay stabbed in the middle (fig. 6), which may rank with the cylindrical loom-weight as indigenous, of

the Bronze Age. There is a good deal of character in one assigned to the Hallstatt period (fig. 11) in the form of a double truncated cone, dished on one face which was presumably uppermost in use; and though such things were not always made to pattern, it is interesting to note this type among those recovered from the Hallstatt habitation-site on the Lochenstein near Balingen,

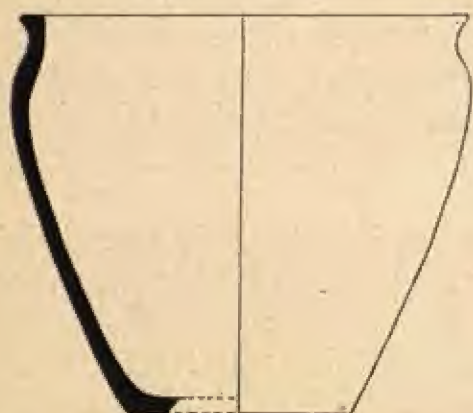


Fig. 8. Restored urn of coarse brown ware, from shallow pit in Hallstatt area, Park Brow. (1/4)

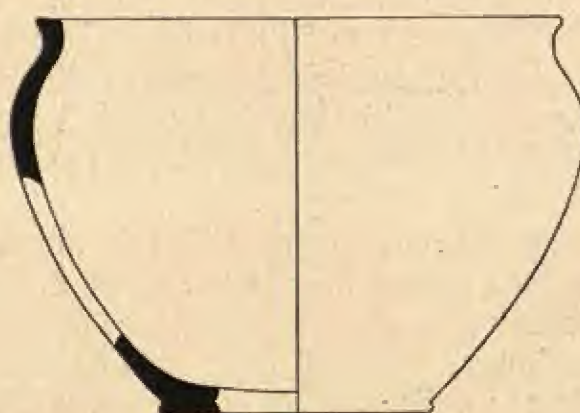


Fig. 9. Fragments of black urn, from Hallstatt area, Park Brow. (1/4)

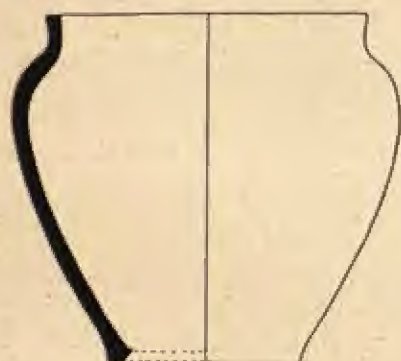


Fig. 10. Pottery urn attributed to La Tène I, from a pit on Roman site, Park Brow (Brit. Mus.). (1/4)



Fig. 10 A.

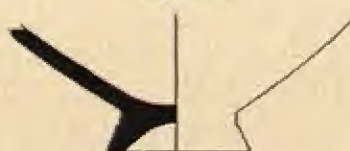


Fig. 10 B (Brit. Mus.).

Figs. 10 A and B. Pedestal bases of urns, La Tène I date, Park Brow. (1/4)

described in some detail below (Bersu and Goessler, p. 98, fig. 10). The other three here illustrated (fig. 6) are apparently of La Tène date, the truncated ones being 1 3/8 in. long.

Still retaining traces of the Hallstatt profile, pottery of the period known as La Tène I has been identified on the site; but the finger-nail decoration goes out of fashion, and the foot assumes the pedestal form (fig. 10, A), which becomes more and more depressed (figs. 11, 12) till it almost disappears in the so-called pedestal urns of Kent and Essex during La Tène IV (50 B.C. to A.D. 50). Unfortunately the vessels so finished are imperfect; however, the ware is not only identified by its soapy feeling, but to confirm the chronology there is a most

remarkable Swiss importation (fig. j) in the form of a bent silver ring (*anneau ployé*), the use of which is unknown, though its origin and date are well established. M. Viollier figures several from dated sites in Switzerland to which country they are almost confined (*Les sépultures du second âge du fer sur le plateau suisse*, pl. 28, figs. 19-23); and assigns them to the third stage of La Tène I, between 325 and 250 B.C. This discovery is not only a fixed point in the chronology of Park Brow, but a broad hint as to the commercial relations, if not the original home, of these Early Iron Age inhabitants of Sussex. A more accessible but less explicit notice of these silver objects is given in Déchelette's *Manuel*, pp. 1266, 1244; but no one has so far given a reasonable explanation of the type.

In full agreement with this silver relic is an iron brooch, corroded but complete, and clearly of La Tène I date, found by Mr. Wolseley on a corresponding (and probably contemporary) site at Findon Park, two miles distant. The double bilateral coil at the head, the depressed bow, and returned foot ending in a disc which just touches the bow, are unmistakable characteristics, which are naturally more often found in bronze examples here and in France. Other finds at Findon Park are illustrated (fig. g) as they fall into place, and confirm certain associations already noticed at Park Brow. The vases have hollow but depressed bases, and the angular mouth is in direct descent from the Hallstatt type (figs. 11, 12, and *Antiq. Journ.*, ii, 356-7). The larger vessel has a smooth surface, the smaller is of coarse ware and when found contained charcoal on the bottom and sides, evidently kitchen ware but found with the brooch. The loom-weight and spindle-whorls are of types already published from Park Brow (*Antiq. Journ.*, iv, 356-7, figs. 16, 18), and the former is imperfect at what was presumably the lower angle when in use, having apparently been worn away as far as the perforation (view at side) by swaying on the loom in contact with the ground.

The entire profile was recovered of a cooking-pot (fig. 11) attributed to La Tène I, with white grit in a brown body, and a somewhat rough surface. Its affinity to the Hallstatt type is evident, and the general trend of its evolution is towards a softening of the angles as well as the paste. The kitchen ware of Hallstatt facies, at least on this site, is baked very hard, and in the succeeding period the paste is not only softer but has generally a soapy feeling, perhaps due to polishing with a bone tool or the open hand.

The ceramic technique seems to change in La Tène II, but as the earlier profile appears again in La Tène III, the flower-pot form (fig. 13) may be only a temporary aberration, and need not be taken as evidence of new blood. Indeed, Mr. Wolseley is convinced that after the Bronze Age the local inhabitants remained Celtic till well into the Roman period. The absence of con-

temporary fortifications points to a continuous and peaceful occupation of Park Brow; and the persistence of ceramic forms and methods negatives any racial or cultural break during the centuries in question.

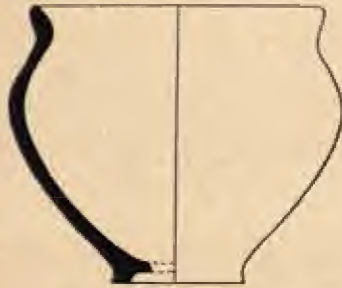


Fig. 11



Fig. 12

Figs. 11, 12. Two urns found with iron brooch (fig. c) in a pit, Findon Park. (½)

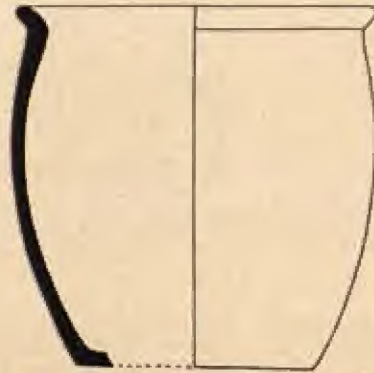


Fig. 13. Pottery urn attributed to La Tène II from a pit on Roman site, Park Brow (Brit. Mus.). (½)



Fig. 13A. Fragments attributed to La Tène II, from pits on Park Brow and Findon Park sites. (½)



Fig. 13B. Sagging base of urn, from Roman site, Park Brow. (½)



Fig. 14

Figs. 14, 15. Ornamental urns from La Tène II pit on Roman site, Park Brow. (½)

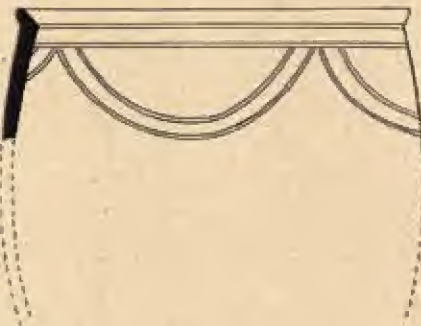


Fig. 15

In La Tène II not only does the profile change but the lip has an inner bevel, and decoration assumes many forms (figs. 13-15) which may be compared with fragments from Wisley, Surrey, illustrated in the *Antiquaries Journal* (iv, pl. xix).

Large enough fragments have been found to provide striking examples of the swag or festoon which is more fully developed at Glastonbury (Bulleid and Gray, ii, especially pl. LXXVII); and a date about a century before the lake village is quite appropriate for this phase of Park Brow.

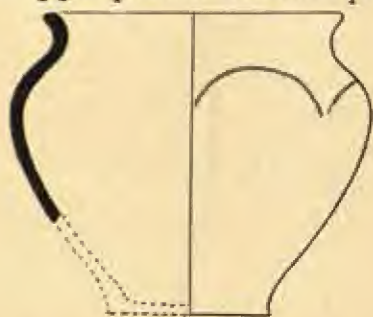


Fig. 16.

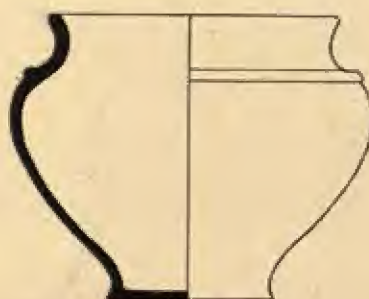


Fig. 17.

Figs. 16, 17. Urns attributed to La Tène III, from Roman-Celtic trench on Park Brow (see fig. v). (½)



Fig. 18. Part of urn with deep burnished lines from Roman-Celtic trench on Park Brow (La Tène III). (½)



Fig. 18A. Part of urn with incised lattice-pattern, Roman-Celtic trench. (½)

Antecedents are therefore available for the simplified festoon pattern seen on several specimens from the site, attributed to La Tène III (figs. 16, 18–20). Concurrently there is a move towards bolder curves in the profile, and in fig. 17 is seen a cordon on the shoulder, a feature that has an important history in this country, but is strangely localized. Figs. 19, 20, even apart from their bases, are unmistakably allied to the Aylesford type of Kent and Essex (Bushe-Fox, *Report on Swarling Urn-field*, pls. vi, vii), and perhaps represent a stage between the Marne and main British series. If the 'pedestal' urns (as they are generally called, even with the foot-cavity reduced to a minimum) from Park Brow are taken as representative of La Tène III, the Kent group can be conveniently called La Tène IV (the period between the Roman conquests of Gaul and Britain). The technique is excellent owing to the gradual introduc-

tion of the potter's wheel, the ware thin and somewhat 'leathery', with grooved and dotted patterns. The vertical markings on fig. 22 are peculiar, and the rough lattice pattern on fig. 18 A may be compared with one of the late Dr. Rowe's discoveries of the same period at Margate. Perforations to the



Fig. 19. Part of urn from Roman-Celtic trench on Park Brow (La Tène III). (†)

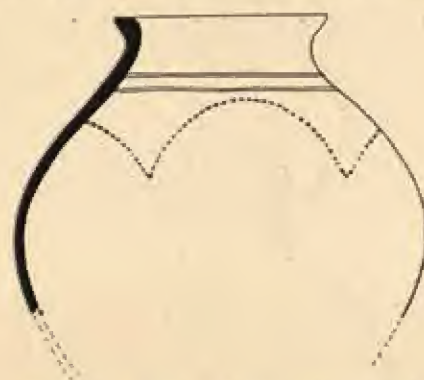


Fig. 20. Part of urn with dotted lines, from Roman-Celtic trench, Park Brow, La Tène III (Brit. Mus.). (†)

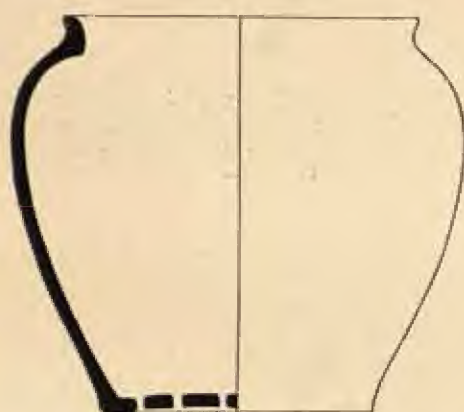


Fig. 21. Urn with perforated base, from Roman-Celtic trench, Park Brow, La Tène III (Brit. Mus.). (†)

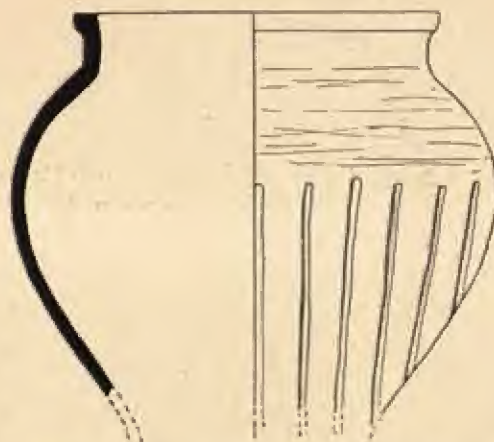


Fig. 22. Urn with burnished-lines from Roman-Celtic trench, Park Brow, La Tène III (Brit. Mus.). (†)

number of nine exist in the base of one urn (fig. 21) which probably served as a colander; and fig. 22 shows the first traces of the potter's wheel.

The ring-headed pin of iron (fig. κ) with humped stem is a useful indication of date, as its prototype was found with a late Bronze Age hoard at Taunton (*Arch. Journ.*, xxxvii, 97; *Archaeologia*, lxi, 139), and there are two of bronze in the Ashmolean Museum from South Hill, Woodeaton, near Islip, which are clearly related. The place of the Park Brow variety in the type-series published in *Proceedings*, xx, 344, and in *Opuscula Oscari Montelio dicata*, p. 282, is easy to determine, as it clearly comes between those made with wire and those cast with a solid ring-head; and the approximate date would be

third century B.C., which would correspond to La Tène II in this country. Foreign examples on the same principle but furnished with heads of different shapes are illustrated in Undset's *Auftreten des Eisens* (pl. xxi, fig. 4; pl. xxvi, figs. 16-19) from north Germany, and all are clearly derived from the swan's-neck pin of the Hallstatt period.

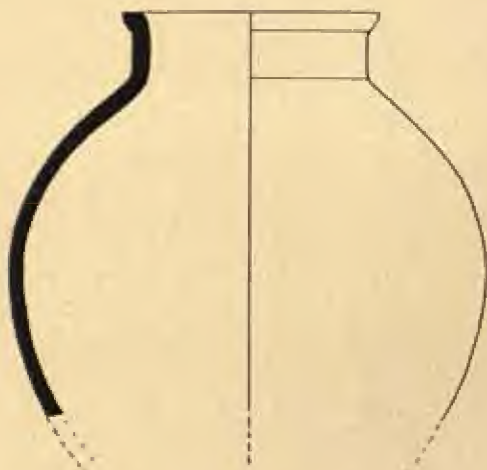


Fig. 23. Ovoid urn, from Roman-Celtic trench, Park Brow, La Tène III. (1/4)

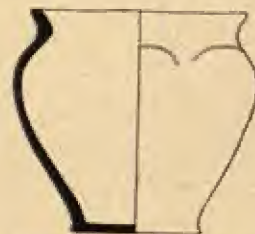


Fig. 24. Decorated vase, from Roman-Celtic trench, Park Brow, La Tène III. (1/4)



Fig. 25. Plain globular vase, from Roman-Celtic trench, Park Brow, La Tène III. (1/4)

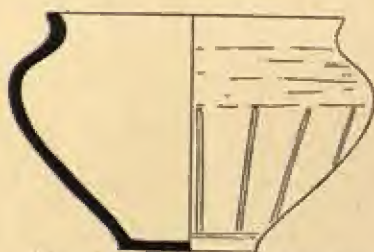


Fig. 26. Urn with vertical burnished lines, Roman-Celtic trench, Park Brow, La Tène IV. (1/4)

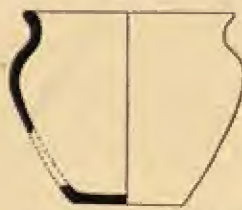


Fig. 27. Reddish-grey vase found 18 in. deep in Roman-Celtic trench, Park Brow, La Tène IV. (1/4)



Fig. 28. Grey dish, found near fig. 27, La Tène IV (Brit. Mus.). (1/4)

The bone implement (fig. j) is now recognized as a lance-head, a sloping cut at one end producing the point, and two pin-holes at the open end serving to secure the shaft by means of a bronze or iron peg.¹ Smaller ones are more common and were used as arrow-heads (Brit. Mus. *Early Iron Age Guide*, 2nd edn., fig. 122); but an example 5 1/4 in. long is figured from Cold Kitchen Hill, Wilts., and was found with five others (described as gouges in *Wilts. Arch.*

¹ For other examples see Mortimer, *Forty Years' Researches*, fig. 493; Hoare, *Ancient Wilts.*, i, pl. vii; *Archaeologia*, xliii, p. 435; lxi, pl. LIX, 2, p. 444; *Wilts. Arch. Mag.*, xl, 35 (Ledbury Camp).

Mag., xxvii, 286). Two iron brooches of early La Tène type and a shouldered pin akin to fig. κ give an approximate date for this Wiltshire site. Both pierced and unpierced examples have been found in plenty at All Cannings, Wilts. (Mrs. Cunnington's plates 8 and 9), and the dating of that site fully confirms the Park Brow classification.

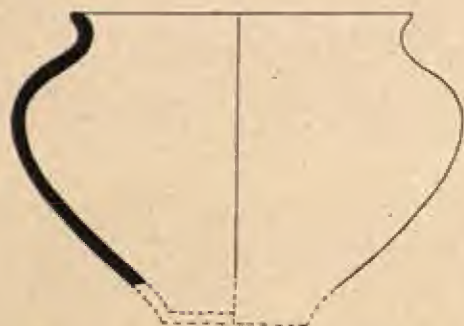


Fig. 29. Grey urn from Roman-Celtic trench, Park Brow, La Tène IV. (4)



Fig. 30. Grey urn with perforated base, from Roman-Celtic trench, Park Brow, La Tène IV. (4)



Fig. 31. Grey dish, from Roman trench 1, Park Brow, Roman period. (4)



Fig. 32.



Fig. 33.

Figs. 32, 33. Urns with wave and chevron patterns, Roman trench 1, Park Brow. (4)

The upper part of a large pedestal urn (fig. 22) shows clearly the marks of the potter's wheel, the ware being soft and greyish; and other specimens assigned provisionally to La Tène III are figs. 23-5, the first having a vertical (cylindrical) neck that is a good chronological feature. To this period may be assigned a small bronze brooch in one piece (fig. 1).

The purely Roman series is fairly extensive, but of less interest from the present point of view, all being connected with the Roman houses discovered at the foot of the hill. There is a good Samian bowl (fig. 39) of the second century, and copies of forms 27 (fig. 35) and 30 (fig. 36), probably of the same century, to which the jug (fig. 37) with angular handle may also be assigned. The cooking-pot (fig. 40) with a deep zone of burnished lattice-pattern is of an early period, as a vertical line from the lip falls well within the bulge: in the

middle Roman period a vertical line will touch both the lip and bulge, and later the lip extends beyond the bulge in pottery of this type.

Mr. Wolseley's discovery of successive habitation-sites on Park Brow was followed, with his ready co-operation, by Col. Hawley's excavation of a larger area in the vicinity. This later work was undertaken with Major Tristram's

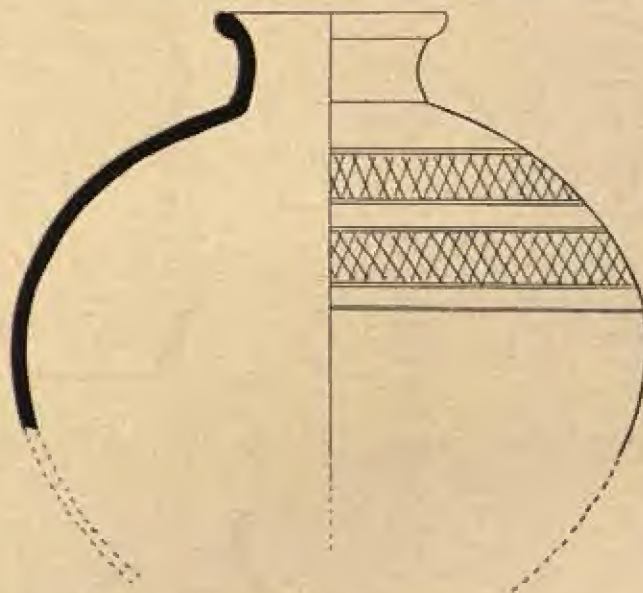


Fig. 34. Urn with latticed zones, Roman trench 1, Park Brow. (1)



Fig. 35.

Fig. 36.

Fig. 37.

Figs. 35-37. Roman pottery from trench 1, and house-site, Park Brow. (1)

consent, and was rendered possible by the generosity of an anonymous friend, through the Secretary of the Society. Without encroaching on the Colonel's Report which follows, it may be worth while to summarize a similar overlap of culture on a hill-site in or near the earliest known home of the Celts. The two plans have been redrawn by permission for the benefit of English readers, and the outline of these primitive dwellings can be identified by the rows of post-holes (*P* with consecutive numbers) sunk in the living rock (figs. M, N).

The Lochenstein is a rocky eminence rising to 3,210 ft. on the watershed

of the Danube and Neckar near Balingen, and is one of the best known pre-historic sites in Württemberg. Systematic excavations were undertaken by G. Bersu in 1923, and a report by himself and P. Goessler was published in the following year's issue of *Fundberichte aus Schwaben*, Neue Folge ii, p. 73. There are seven plates and eleven illustrations that reveal many points of contact with Park Brow, and a parallel in the homeland of Hallstatt culture not only confirms the suggested sequence on the Sussex Downs, but gives a hint as to the origin and route of the Celtic invaders of Britain.

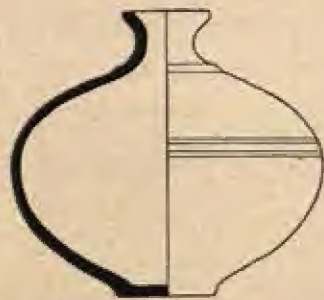


Fig. 38.



Fig. 39.

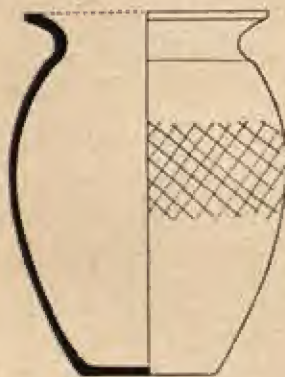


Fig. 40.

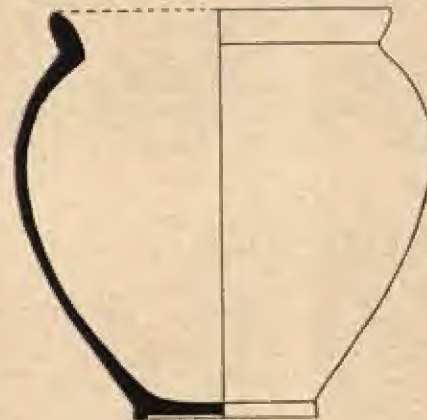


Fig. 41.

Figs. 38-41. Roman pottery and Samian dish from house-site AA, Park Brow. (4)

The occupation of the site was clearly in two divisions, one on the southern slope and the other on the north-eastern terrace. The former yielded remains of the Bronze Age, also late Hallstatt (D) and Roman periods, which were stratified in favourable positions, but were mainly confined to different areas below the summit. The published sections show successive platforms cut in the rock, but masked by a continuous slope of debris: pits and dry-walling also appear, and it was possible to lay bare the entire plan of a late Hallstatt dwelling, which is surprisingly like that disclosed by Col. Hawley at Park Brow. One narrow end of the oblong building faced the prevailing WSW. wind, and measured about 23 ft. between the interrupted lines of post-holes, the

extreme length being about 63 ft. In the plan here reproduced by permission *P* indicates a post-hole, *H* a hearth, and *a-c* pits and trenches; but omitted from the plan is a trench entering the area on the left of *P* 1, running parallel

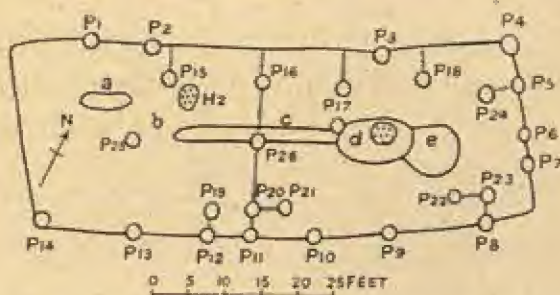


Fig. 11. House-plan with post-holes, Hallstatt period, Lochenstein, Württemberg.

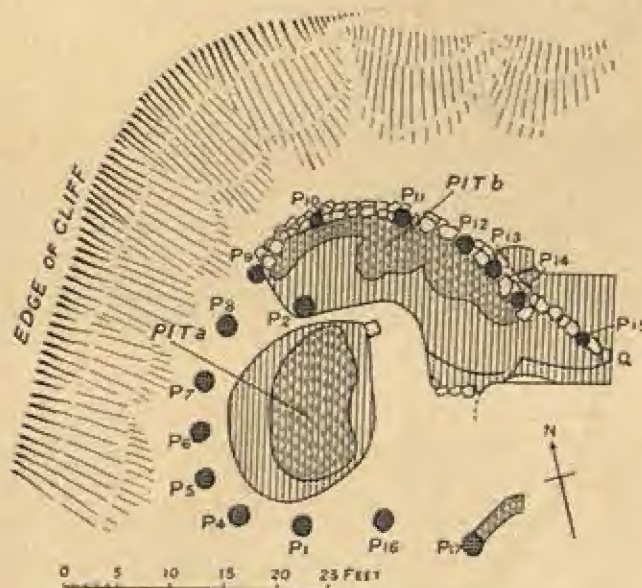


Fig. 12. House-plan with post-holes, La Tène period, Lochenstein.

to the end wall, then turning almost at a right-angle and running parallel to the front wall in a line between the central trench and post-holes 19-21, and ending level with hearth 1, in a post-hole 18 in. deep. This trench had a uniform breadth of 20 in., and as it was below the level of the floor and contained Bronze Age relics, it was clearly there before the house was planned. The presence of only one post-hole on the windy side is not explained, but a sleeper-joist is not excluded. The trench *a* measured 20 in. in breadth and 6½ ft. in length; *b* was a pit 12 in. deep and 4½ ft. across, with a post-hole in the middle; and trench *c*, 12 in. deep, 20 in. broad, and 23 ft. long, ended in two large pits respectively 20 in. and 12 in. deep, in one of which was a hearth of packed stones covered with ashes. There is evidence that the house was destroyed by fire, and it is claimed as the first fully excavated example of its period.

The inner rows of posts are supposed to have belonged to cubicles for sleeping, and the dotted line across the plan shows a possible division of the space on the theory that *P* 11, 12, 19, 20, and *P* 8, 22, 23 represented two entrance porches. The superstructure seems to have been timber caulked with moss, there being no trace of wattle-and-daub; and the labour of bringing the timber to the bare mountain top must have been considerable.

Considerable silting on the slope indicates a long interval during which

the site was derelict, and also a climatic change for the worse in the fourth century B.C., for which there is also evidence elsewhere. The Hallstatt people who came from the eastern Alps, the home of Iron, had here been more pastoral than agricultural; and the Report distinguishes them from the Celts who arrived about 300 B.C. and took possession of the deserted mountain-top. Here they built at a still higher level than their predecessors, on the north-east terrace, with a precipice on the east, and a defensive wall at the south end. A specimen house, with remains of a rectangular Hallstatt building underneath it, is planned and described in the Report, and assigned to the period known as La Tène B (fourth century B.C.). It is reproduced in fig. N.

The post-holes round Pit *a*, though wanting on the eastern side, apparently belonged to an oval dwelling which was soon afterwards enlarged to enclose Pit *b*, the additional posts being set up in the line of dry-walling constructed on the edge of a declivity. Marks on the mud-plaster of the wall show that the posts were squared, and there was a white coating on the outside of the building, the roof being no doubt thatched in conical form. Characteristic pottery was abundant but mostly in small fragments, and specimens of each period are photographically reproduced on the plates; but more important still are the profiles or rim-sections in the text arranged chronologically, with drawings of spindle-whorls, stone and metal objects recovered from the site.

III. FURTHER EXCAVATIONS ON PARK BROW

By LT.-COLONEL WILLIAM HAWLEY, F.S.A.

THE following is an account of excavations carried out under the Society's auspices by Mr. Garnet Wolseley and myself at an Early Iron Age dwelling on Park Brow in Sussex during October and November 1925. The site is part of a long spur of downland which extends from the direction of Chanctonbury on the north, sloping gradually to a deep valley on the south, from which Cissbury rises on the opposite side, and there are deep valleys on both sides of the spur (fig. o).

The south end of the headland seems to have been attractive to the early races, and to have been in continual occupation from the Bronze Age until the end of the Roman occupation; and Mr. Wolseley has located certain isolated places upon it, yielding pottery and other objects characteristic of the Bronze Age, Early Iron, and Roman periods. The dwellings were set on the east and south-east of the spur, where the inhabitants could have had the benefit of the winter sun, escaping north winds and westerly gales, and carefully avoiding the slope on the reverse side; but the more favoured side showed signs of habitation extending beyond where we were digging.

Permission for the undertaking was kindly granted by Major Tristram, the owner of the estate, who most generously allowed us 100 square yards for investigation. It was impossible to deal with an area so large as this in the time we had at our disposal, so it was subdivided into squares of 75 feet, and little more than two of them could be opened in the time. Those selected included trenches cut by Mr. Wolseley on a previous occasion; and the successful results were reported by Mr. Reginald Smith and himself in our *Journal*, but more information was considered necessary, and on this account the work now to be described was undertaken.

We began by stripping the turf from the surface, and then carefully examined the rubble under it, until the surface of the solid chalk was exposed. We then became aware that the square included the site of a hut-dwelling which extended beyond the square towards the north-east side, so our digging had to be prolonged.

The rubble over the chalk had a normal depth of about 9 in., which was fairly constant at the sides and was composed of loose, fairly clean, chalky matter; but towards the centre the depth became very irregular, and the soil more and more dirty, until it became a compound of sooty matter and wood ash, containing comminuted flinty grit and angular pieces of burnt flints, also

rounded ones known as 'pot-boilers', the splintering of which created the grit.

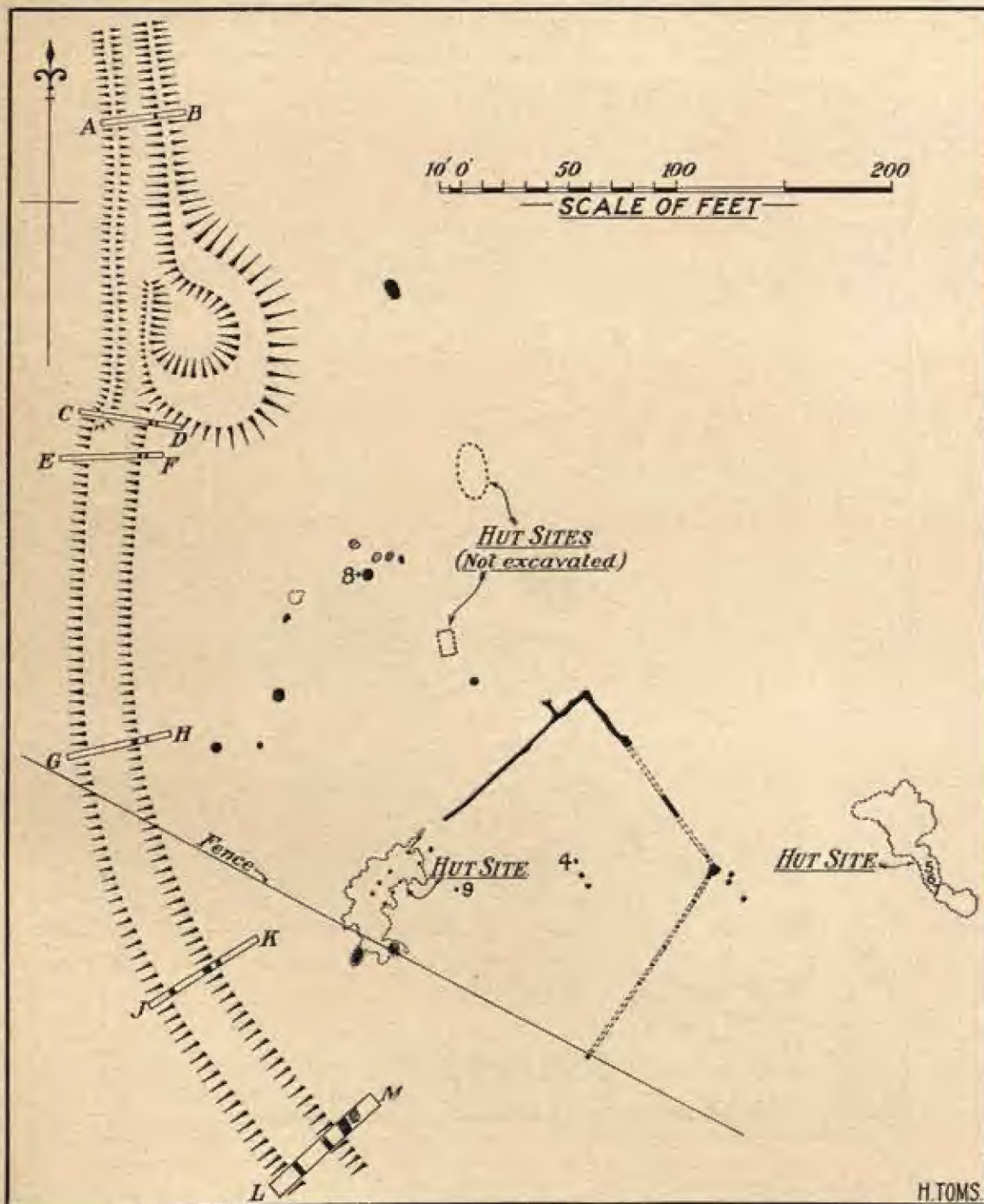


Fig. o. Part of the earthwork and trackway, with six trial trenches (fig. v) : to the east is the hut-site first excavated, the second being farther east, and the lines between suggesting an enclosure.

This dirty condition was in the vicinity of two large pits, found by Mr. Wolseley on the previous occasion, and they were again emptied so that their positions

and dimensions could be shown as figs. p-s. One of them was about $5\frac{1}{2}$ ft. long, 5 ft. deep, and $4\frac{1}{2}$ ft. wide. The other was roughly round, and about

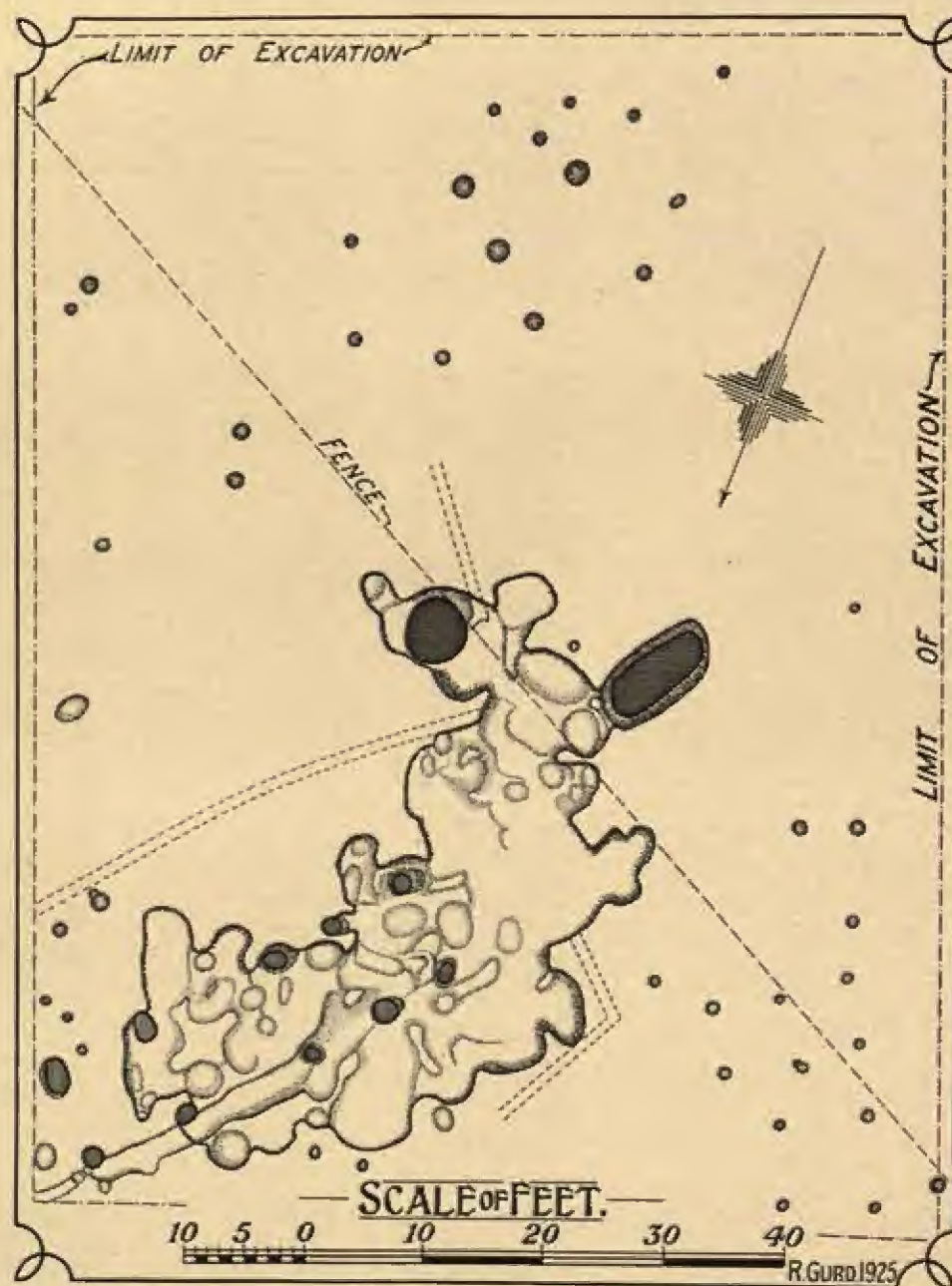


Fig. P. First hut-site excavated, with two rows of large post-holes, and at the south end two large pits (figs. Q and R): on either side groups of smaller post-holes.

$4\frac{1}{2}$ ft. in all dimensions. They must have been under cover, otherwise they would have held much water-borne matter, and they seemed to have been always quite dry. At first I was inclined to think they had been fire-pits for cooking, but it was quite evident that neither of them had held fires. Had

this been the case the side surfaces would have suffered from contact with the fire which would have oxydized the chalk to lime, the erosion causing the pits to become dome shaped. Then again the bottom would have become saturated with the tarry matter of combustion, but instead of this the bottom was quite clean and level, the sides vertical and showing tool-marks.

Although not actually fire-pits, I think they were nevertheless adjuncts in

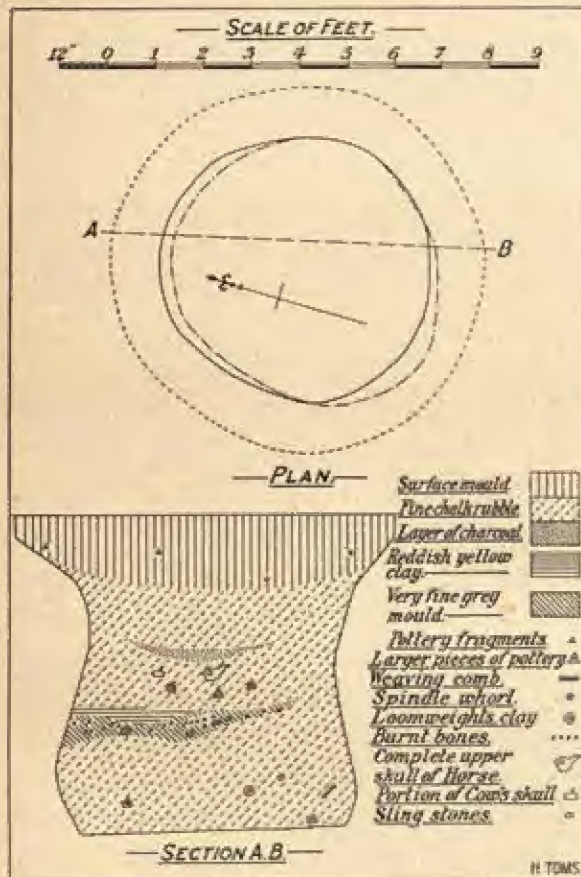


Fig. Q. Plan and section of round pit shown in fig. P.

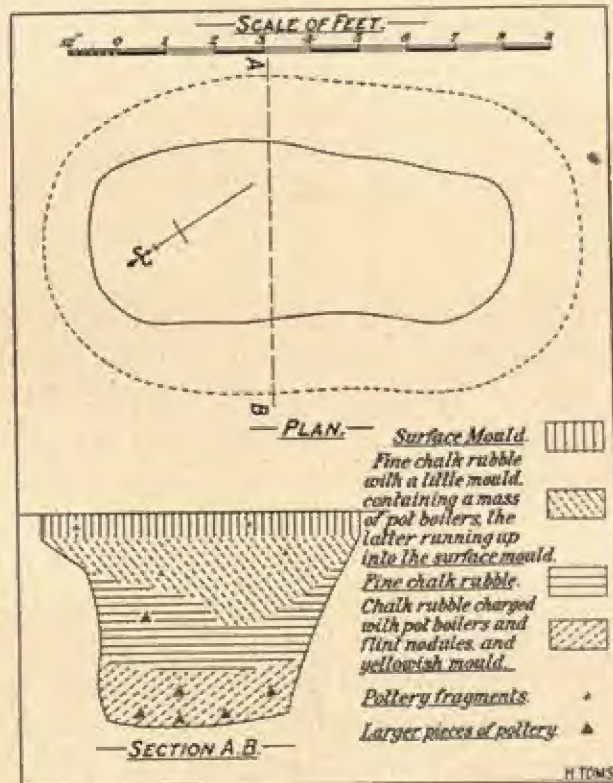


Fig. R. Plan and section of long pit shown in fig. P.

cooking and warming the hut. When first found they were filled with much of the dirty matter, with many large flints below it. I think they had been intentionally filled with flints to the surface, and that the top of the flint mass was used as a hearth. When the upper part of the mass became very foul it was dug out, cast aside, and replaced by cleaner material. Except at this spot there were no indications of fires anywhere on the hut site, and they were an absolute necessity. When filled as described, they would absorb the rain drip from the smoke vent above, and any moisture in them would be carried away as steam. The effect of continuous fire on the flint surface would conduct heat to the entire stony mass in the pit, which, on becoming greatly heated, would

impart some of the heat to the surrounding chalk which would be kept warm and dry for a considerable distance from the pit. I think it can be shown presently that the inmates took advantage of this area for their personal comfort.

We were disappointed in getting but few objects of interest in the rubble and black deposit. A small bronze ring was found close to the oblong pit. It was of $\frac{3}{16}$ in. round wire, and rather too big for a finger-ring, but might have been for personal dress or harness. Being quite plain it had nothing to connect it with any period; but as it occurred at chalk level it might reasonably be ascribed to that of the site.

From the same locality came related fragments of a triangular loom-weight, made of a mixture of clay and calcined flint, some of the pieces being large. Farther afield more pieces of loom-weight came out, also spindle-whorls, one of which had flattened ends and was contracted in the middle like a reel. There were a good many shards of pottery, all of the same period as the hut, mostly footworn pieces, but occasionally a cluster with sharp edges occurred. Bones of horse, ox, sheep, and pig were fairly numerous, often bearing marks of dogs' teeth and of rodents, where the condyles had been gnawed away. There were small collections of mussel shells, but only three or four of oyster, which were water-worn, and apparently brought from the sea-shore, perhaps for mixing with clay for pottery after being calcined or pulverized.

Series and groups of post-holes were seen to be distributed over the site, but it was often difficult to determine what part they had taken in the construction of the dwelling. It was evident that they did not all belong to work of one time, and that during the history of the hut there had been reconstructions and repairs, so that original sets of holes became confused with others of later date. Some might have been put in at odd times for internal supports, whilst many others might have been obliterated during repairs, or since the hut was abandoned. There was, however, a very distinct double line which apparently had formed the main support of the roof and was directed towards the north-east. The holes were very large, showing that the posts they held must have been trunks of large trees quite 20 in. thick, necessary for sustaining great weight, perhaps rising to a very considerable height and carrying horizontal beams across their tops. The sides of the hut might have been made by placing long straight fir poles side by side, with the butts resting on the ground and slanting upwards until their thin ends met just beyond the beams, to which they were secured. This would relieve the weight carried by the posts, but strong supports would be necessary for resisting wind-stress upon the side spaces. The interstices between poles might have been luted with clay and all the outside thatched from top to bottom with reeds or rushes from the swampy lowland. Occasional

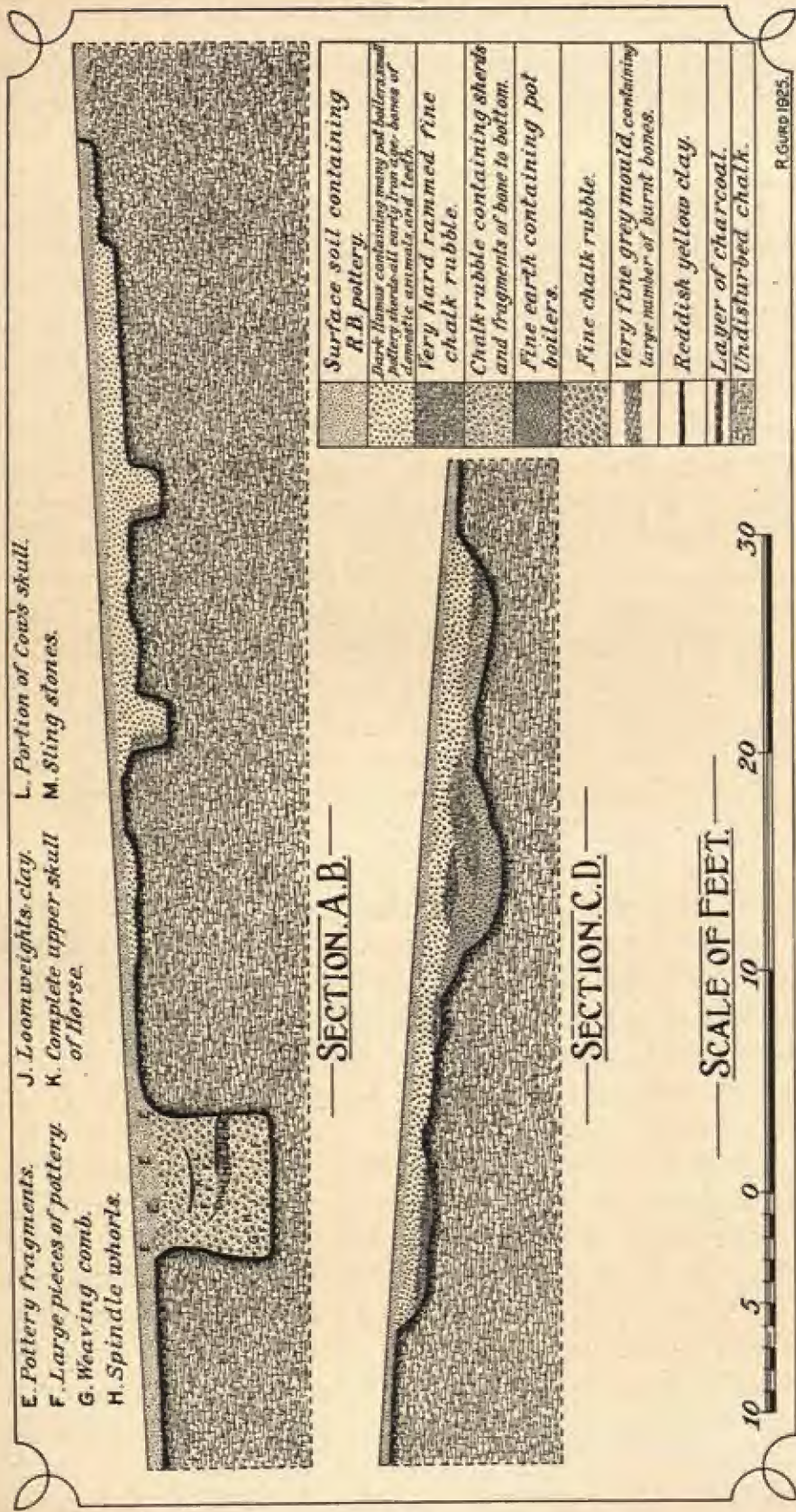


Fig. s. Section AB through hut-site shown in fig. p, with round pit (fig. q) and post-holes.
 Section CD is through hut-site shown in fig. r, without post-holes.

sagging of the sides might have necessitated internal support by props, which would account for independent small holes that were noticed (fig. r).

There was not sufficient to show the exact dimensions of the hut, as the remainder of the large holes in the vicinity of the big pits had been obliterated; but as the pits must have been included in the hut, it could not have been less than 60 ft. long and 40 ft. broad and might have had a return towards the south where there were groups of holes, and if so, the big pits would have been in the angle. Occasionally flat pieces of daub with wattle marks were found in the rubble, suggesting an interior lining of it, perhaps around the lower part of the sides, forming a dado to ensure more protection from cold.

After completing all that could be done at this spot we moved to another about 80 yards lower down the eastern slope where Mr. Wolseley had previously found his best pottery (figs. s and t). We were disappointed in the expectation of getting more of it and found we were on the site of another hut, apparently one that had been abandoned in favour of a more suitable place; but despite its ruinous state, the site was nevertheless interesting. Under quantities of dirty rubble the natural chalk was in a state of complete chaos. All the posts and material had been dragged out of the ground; and although it was occasionally possible to detect definite lines, almost all vestiges of supporting posts had been destroyed.

By excavating the broken ground up to the edges a very fair idea of the extent of the building could be got, but the design was obscure and one could not tell whether it had been round or square, but the capacity was less than that of the first. One point of interest was that there had been a passage attached to it, leading towards the south about 40 ft. long and 6 ft. or 7 ft. wide, ending in an entrance, which turned sharply to the east for about 8 ft. A combination of this sort would have prevented wind blowing directly into the hut and would have been also protective against a hostile attack. Nothing of metal was found on this site but there were a good many shards of pottery and occasionally clusters with related pieces.

These dwellings (and no doubt a great many more) seem to have been included in a fenced enclosure, or compound, protected by a strong palisade of considerable extent made of baulks of timber set side by side in a trench. On the west side the palisade formed part of the side of a trackway still discernible. A corresponding line could be seen half-way down the eastern slope extending from south to north, but the connecting side-lines were very faintly visible owing to levelling by the plough in later times and probably even before the Roman occupation, which might well account for the dearth of the objects in the hut sites.

At the trackway we made six cuts through the bank (figs. o and u), continuing

them through the fairway and a little to the west beyond it. In cut M-L we came upon the palisade trench, finding it to be 4 ft. deep with roughly cut and rather inclined sides in natural chalk; and could trace the trench in other cuts on the north. A hole on the east of it in M-L might have been a repair, but two small trenches to the west are more difficult to account for. They seem to traverse the bank all along to the north, but the one west of the trackway dies out owing to lowering of ground level.

It seems improbable that the place had a triple palisade, and consequently the small trenches may have been made quite early, to mark the confines of

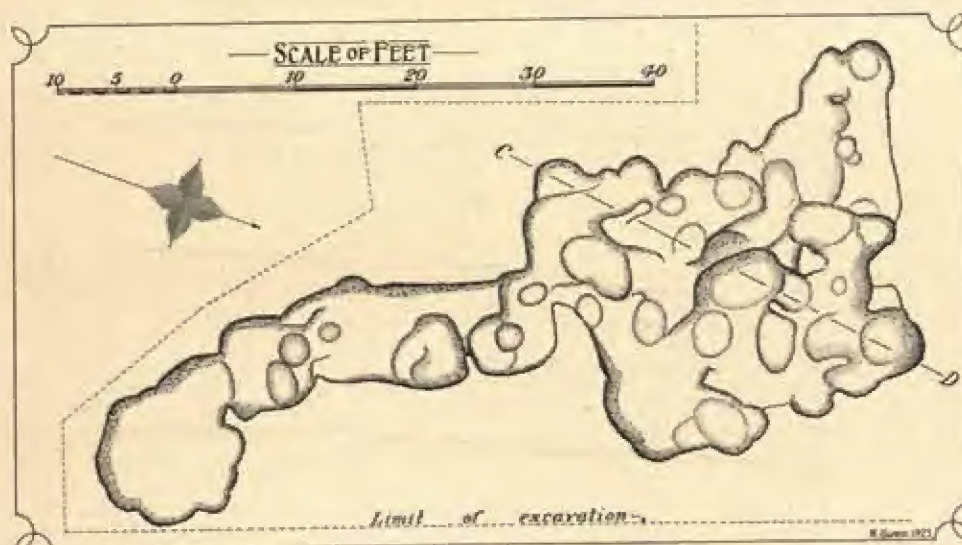


Fig. 1. Plan of hut-site shown on right of fig. 0, with narrow passage ending in an entrance on the left: for section CD see fig. 8.

adjacent properties ending on the crest of the spur and leaving the intermediate space for common use where any one could go to and fro without molestation. There must have been some common understanding amongst the tribes everywhere to this effect even before this period, otherwise there could have been no peaceful traffic, and hawkers with their merchandise would have been in constant peril of robbery. It is not unlikely that the very long trackways seen in many parts of the country were something of the same sort, intended for the safe conduct of not only native travellers, but even foreigners, just as Pytheas made his journey across Britain: they were in fact a humble beginning of the later high roads.

The trackway bank deserves special mention, for to our astonishment it proved to be solid chalk. The palisade must have stood originally on the surface of the downland, but the constant use of the track by wayfarers keeping a little way from the side of it caused a gradual widening and deepening of the soil there until the bank stood 2 ft. above the trackway. Long-continued

ploughing had carried away the soil evenly on both sides, particularly on the west side where it had begun earlier than on the east, creating an impression that the present even surface was the former natural level, and it was this that

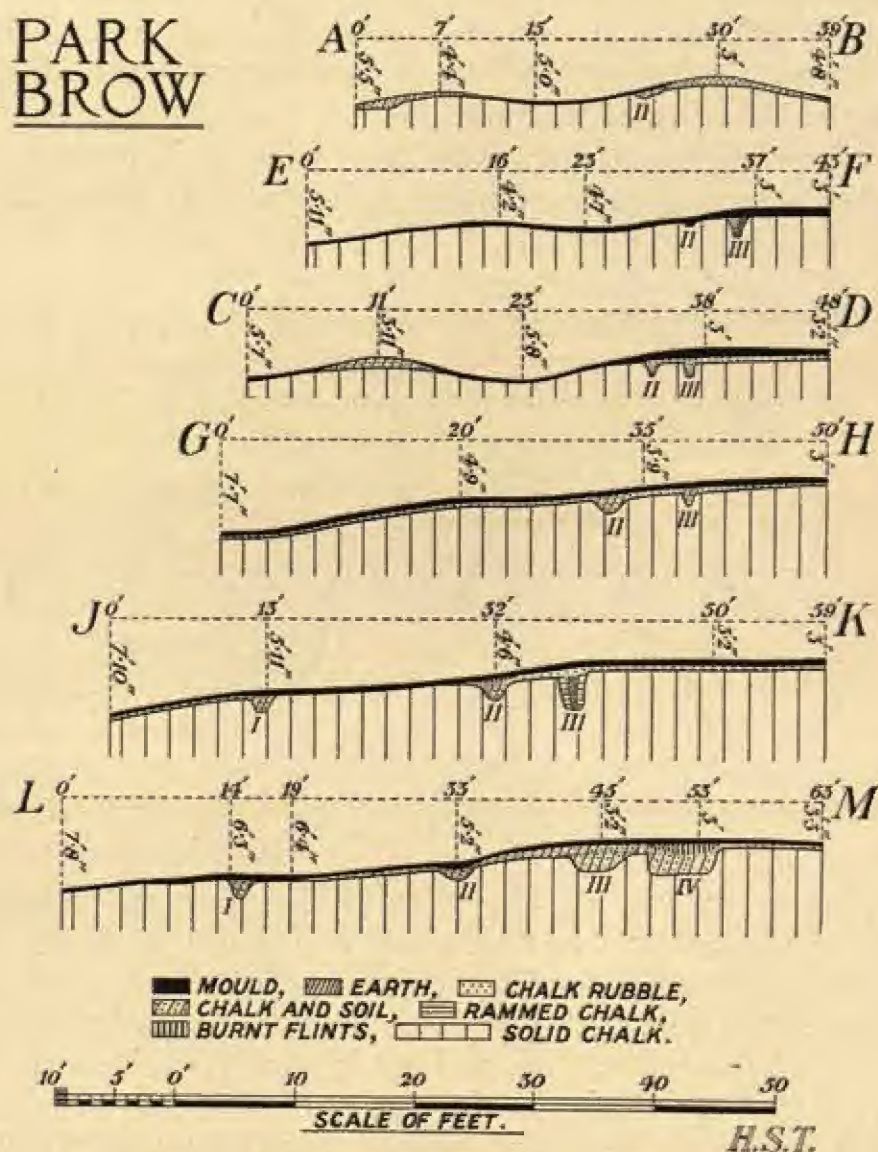


Fig. v. Sections of Celtic trackway (fig. o), showing holes of palisade.

made the bank appear to be artificial. It is wonderful how ploughing along the ridge could cause such an immense displacement of soil by constant gravitation down the slopes. Dr. Curwen has particularly drawn attention to this when describing Sussex earthworks, and the present case is an excellent illustration of his theory. The fairway of the track, about 18 ft. wide, was quite level and on natural chalk with but little of later deposit over it and showing no

signs of wheel ruts, so it can have been used only by pedestrians and pack animals.

The cuts through the bank were made near a place which had evidently been the entrance to the palisaded compound. Long-continued traffic towards the gate had caused general erosion and a slight incline in the track in the vicinity of it. Probably just opposite the gate there would have been a cavity which after rain would have held water and become troublesome. To obviate this they seem to have set back the fence and gate and to have dug a deep pond round which they could approach the gate on dry ground. The pond would have afforded them a supply of water for their animals, also a certain amount of protection from hostile attack on the gate. When dug into a short time ago the cavity was found to be 7 ft. deep and to contain a great quantity of water-borne matter which had been deposited later, showing it to have been quite a capacious pond. There is a rather similar pond at the west entrance to Stockton earthworks in Wilts., which was apparently fed by water from the main street; but the chief supply of many early settlements must have been from small streams then running in the valleys below.

The dearth of objects no doubt was caused by ploughing in times subsequent to the existence of the hut, particularly during the Roman occupation, but the period of the hut enclosure must have been rather a long one, to judge by the quantity of dirty black rubbish discarded and thrown against the inside of the palisade. This contained great quantities of pot-boilers; but as their pottery was hard and could withstand fire, the people probably employed the stones in the cooking of food. The method would be to tie up meat and condiments in a skin. A cavity would be made in the hearth (already hot), the skin placed in it and the pot-boilers heaped around and over it. When the fire was applied outside the pot-boilers, there would be no actual contact with the fire to destroy the skin, and a gradual stewing went on inside it. A similar method has been in use by gipsies even in recent times, by placing an unskinned rabbit or hare covered by a film of clay in a cavity under a fire, the spot being already hot from a previously lighted fire.

I think I have said all that is actually relevant to the digging, except that the men engaged were all ex-service unemployed men, under a very excellent foreman, Mr. Teale. I should like to record my grateful thanks to Major Tristram for little kindnesses apart from his permission for digging, and to acknowledge the great assistance afforded me by my colleague, Mr. Wolseley. The excellent drawings are the work of Mr. R. Gurd, of Hove, with the exception of three prepared by Mr. H. S. Toms, who very kindly made a present of them for this report.

DISCUSSION

Mr. CRAWFORD remarked on the double lynchet way shown on the screen : two ditches along the sides occurred more than once, and in one case a double lynchet way ran into a Roman road. That on Park Brow was among the best examples of the type, and compared favourably with the road on Woodcuts Common which had a ditch on each side.

Dr. CURWEN thought the curious *diverticulum* on the Celtic road could only be explained by other examples. On Bow Hill, Binderton, there was one on the upper side of a road, where water could not run into it. There was no question of a pond as no chalk-wash was found in it, and there were channels down both sides of the road, but no channel through the *diverticulum*. At Church Barrow in Wilts. there were channels on both sides of Celtic roads, and the same thing was seen at Buckland Bank. A section there showed chalk-wash due to the scouring of the road which ran down hill, and the ditch had evidently been made to drain the road. A bank had been thrown across the opening of the *diverticulum*, wide in parts and higher than the roadside bank, so that no water could pass. Stones had been found in the hollow with a quantity of shards in and under them, some blackened with soot ; and some kind of fire was found just in the centre.

The CHAIRMAN (Mr. Emery Walker) conveyed the thanks of the meeting to Col. Hawley for undertaking the excavation and reporting on it to the Society.

II.—*The Armourers' Company of London and the Greenwich School of Armourers.* By CHARLES FFOULKES, Esq., B.Litt., F.S.A.

Read 25th March 1926

IN making researches into the early history of the Armourers' Company, we are faced with the question what kind of craftsman was the armourer or 'armorarius' up to the middle of the fourteenth century. On consulting the recognized reference books on the subject, up to the present I have found no word used to denote the maker of defensive armour and offensive weapons as distinct from any other craft till the end of the thirteenth century. Smith translates armourer as 'faber armorum', and Riddle and White do not even give this qualification under the word 'faber'. Du Cange gives 1412 as the earliest use of the term, Murray 1386, and Gay 1351. The nearest approach to the word is 'armarium' from which we get 'armoir', a closet or cupboard to keep arms, clothing, and possibly, but not necessarily, armour.

This suggests that the early armourer was also the smith who purveyed implements of war, besides other things for agricultural and domestic use. It would be almost superfluous to point out that from the decadence of the Roman Empire up to the middle of the fourteenth century but little plate armour was worn except the headpiece, and the fighting man relied either on what we term 'chain mail', which is of such a peculiar form of construction that it must have been made by a class of craftsman quite distinct from the ordinary metal-worker, or on leather or quilted fabrics with, in course of time, small reinforcing pieces of plate attached by rivets or lacing.

It therefore seemed advisable to consult the early records of the Merchant Taylors' Company in order to see what functions they performed in respect of the provision of military equipment. Herbert, in his *History of the Twelve Great Livery Companies*, states that at the end of the thirteenth century they were styled 'Gilda Armararii', and that this title was changed to 'Cissores et Armurarii Civitatis Londoniensis'.

I understand from those who have gone more minutely into the records of the Merchant Taylors' Company than I have been able to do, that Herbert is not always reliable, and often inaccurate, but I cannot understand how he can have recorded the title 'Gilda Armararii' without any evidence to support it. I need hardly say that he gives no authority for his statement, but in justice to him it should be noted that the earliest records of the Merchant Taylors' Company are missing.

It is certain that in 1300 there was a Gild of Taylors and Linen Armourers,

for in this year they received a licence from Edward I, and in 1322 regulations were drawn up, enjoining that no armour was to be sold covered with fabric unless a portion of the armour was left bare in order to show that the covering did not hide faulty metal work. It is, however, by no means clear whether these regulations refer to the Linen Armourers or to the Armourers, that is, the makers of plate defences.

We may therefore assume that the armourer of the early fourteenth century was a purveyor of clothing and equipment, on much the same lines as the modern military tailor, and this seems to be borne out by the fact that there was a separate Gild of Heaumers or helmet-makers in the middle of the century. We have records of Heaumers who were also members of the Armourers' Gild up to the middle of the fourteenth century, and as the qualification 'Heaumer' does not appear in later records, we may assume that from force of circumstances the two gilds were amalgamated. The existence, side by side, of the gilds of Linen Armourers and Heaumers will be understood when we consider that the Heaumer actually forged and fashioned a headpiece of plate, a craft which cannot have been employed for any domestic or agricultural implements, while the linen armourer was only concerned with the making of jacks, gambesons, surcoats, and such-like details of military equipment. What probably happened was that, as plate armour was added piece by piece to the fabric and leather defences, the Linen Armourers found this working in metal was beyond the limitations of their craft, and thus a class of armour smiths came into existence.

In compiling the following notes on the Armourers' Company, the privately printed history of the Company produced by Timothy Morley, the Company's beadle in 1878, has been of considerable assistance. Although his work is not very scientifically compiled, it is written with enthusiasm and love of his subject, and as such is useful in indicating certain records which, on examination, have yielded additional information.

The earliest charter of the Armourers' Company was granted in the thirty-first year of Henry VI, 1453 (pl. 1, fig. 1), but that they claimed a much earlier existence is shown by the fact that in a report to the Court of Aldermen in 1578 they put forward the statement that King Edward II had granted right of search to the Armourers. Owing to the loss of the early records of the Merchant Taylors' Company and the absence of any fourteenth-century documents in the possession of the Armourers' Company, I fear we shall never be able to obtain any more definite information respecting the early days of the Gild or of its association with and subsequent severance from the Linen Armourers, who are now represented by the Merchant Taylors. A grant of arms was made to the Company on the 15th of October 1558 (pl. 1, fig. 2).



Fig 1. Charter of the Armourers' Company, 3 May 1453



Fig. 2. Grant of arms to the Armourers' Company, 15 October 1558



Fig. 1. Third suit of Sir Henry Lee
(Armourers' and Brasiers' Company)

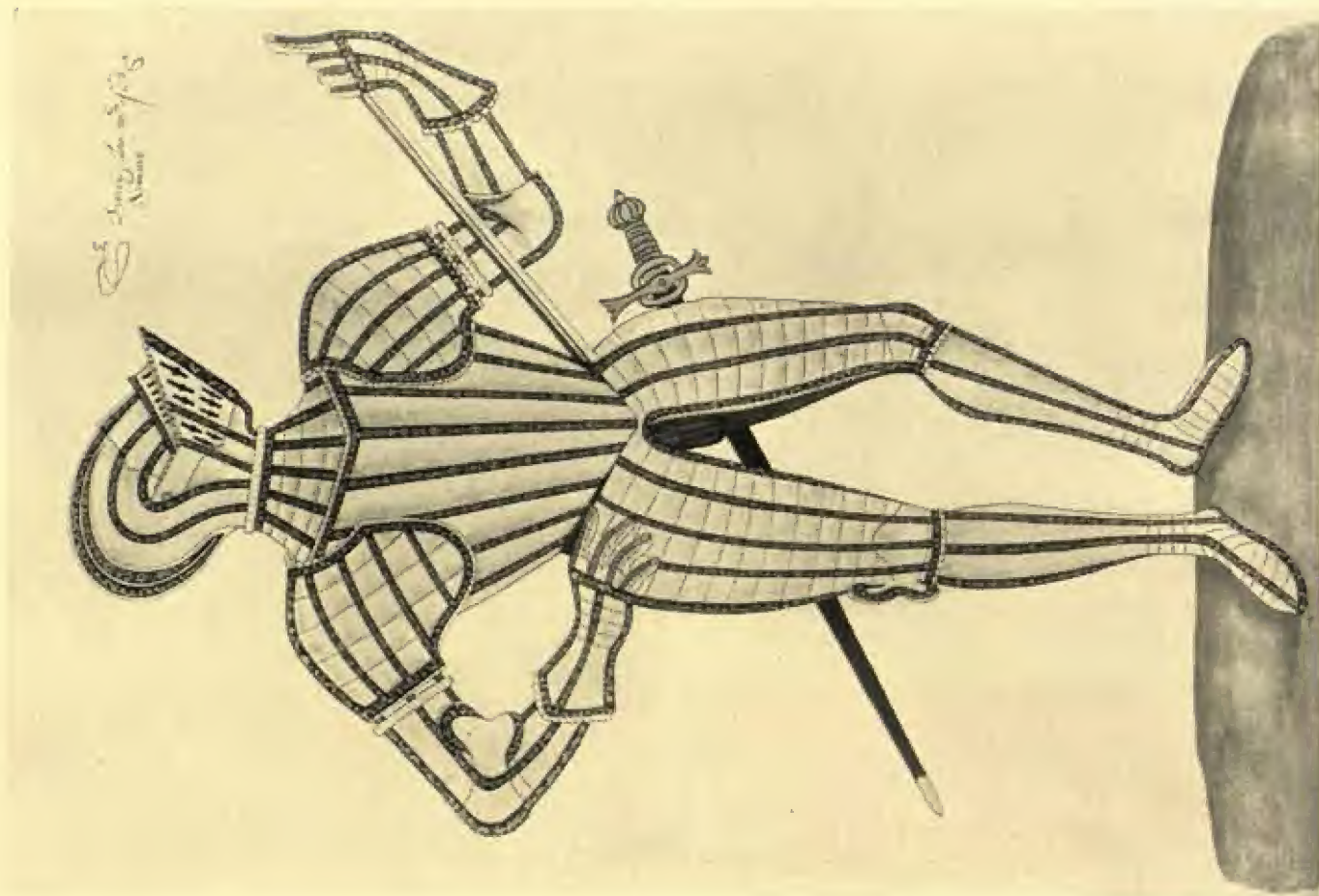


Fig. 2. Drawing of third suit of Sir Henry Lee
(From a facsimile of the drawing in the *Armourers' Album*,
Victoria and Albert Museum)

Like all other trade gilds, the Company functioned under three distinct headings, the first religious, the second social, and the third technical. They appear to have had a chapel dedicated to St. George set apart for their use in Old St. Paul's, and reference to this is made in the Company's books in the Inventory of 1585, wherein are noted two figures of St. George and some armour in the Chapel. The Armourers, who were conscientious observers of religious festivals, together with all such confraternities and organizations, suffered under inquisitions and persecutions for practising popish rites at the Reformation, and doubtless their financial position made them fair game for the blackmailers and informers, of whom the notorious Tipper and Dawe were their worst enemies. On one occasion a heavy fine of 120*l.* was inflicted, and was only paid by selling part of the Company's property in Farringdon Street to John Richmond, who had been master in 1548. The Farringdon Street property was left back to the Company by Richmond on his death.

The social side of the Company was much the same as that of other City gilds. Honest correction was meted out to the apprentices found guilty of brawling, dicing, haunting evil women, being found in taverns and fencing clubs, or wearing swords or ruffs to their shirts, and this 'correction' took the form of a whipping in public in the hall, a rather drastic punishment for wearing a shirt ruff; but at this period the sumptuary laws were strict in the extreme if we judge from the Company's records, for no colours were allowed for the apprentice except white, russet, or blue; and the wearing of great breeches stitched with silk was specifically forbidden. Of course there was also the charitable side to the company's activities under which the members were cared for in sickness, helped in their trade, and buried with ceremony at their death.

An important duty of the City Companies was the provision of men for the Queen or the Lord Mayor for state functions, guards, and other purposes. This was evidently unpopular, for there are many records in the Company's books dealing with appeals. For example, in February 1579, the Armourers were pressed for 12 men out of a total of 3,000 for the whole City, but even this small quota was deemed to be excessive, and an appeal was lodged. The Company evidently considered that they were what in the late War was classed as a 'reserved occupation', as the manufacture of arms and armour was of vital importance to the nation; and this was allowed in some instances and the provision of armour and equipments was accepted in lieu of personal service. On the 24th of March 1571 the Company were ordered to provide two men to take part in a 'show' before the Queen, and in June of the same year the Lord Mayor ordered the Armourers to provide men with cressets and

lights to go with the City Watch. One of the last of these orders for attendance is dated the 4th of September 1704, wherein the Lord Mayor enjoined the Company to attend Queen Anne on the occasion of her thanksgiving at St. Paul's for Marlborough's victory at Blenheim.

Again, in 1727, the Company assisted in the royal progress of George II to the City, and borrowed from the Tower seven suits of armour and a number of weapons, proof positive that at this period the Company had no armour of their own.

On the 13th of August 1761 the Company decided to 'make as brave a show as possible' when George III came to the City to view the Lord Mayor's Show. They provided a band of music of the best performers obtainable mounted on grey horses, and fitted out one man in a 'coat of mail armed with a bow and arrow, and with such ornaments and decorations as may be proper' mounted in a car, and also exhibited a man 'walking in a suit of steel armour'. As they do not appear to have possessed any armour at this period, the suit must have been hired or borrowed for the occasion, quite possibly from the Tower, but the Tower Armoury records from 1739 to 1855 are missing. Up to the year 1877 twenty-six suits of armour and a large number of weapons were issued from the Tower Armouries annually to the Lord Mayor, to equip the 'men in armour' that used to be the most popular feature of the Lord Mayor's Show. At the last-mentioned date the Secretary of State for War informed the City Remembrancer that this practice must now cease, 'so that the National Collection may not be subjected to such rough and irreparable damage'.

The Hall was acquired by the Company in 1428, was added to in 1663, and fortunately escaped the Fire. It was extensively repaired in 1795, entirely rebuilt in 1841, redecorated in 1855, and again in 1872.

It is needless to mention that the records are full of entries respecting dinners and entertainments in the Hall, which was often lent, as for example to the Farriers' Company in May 1612 and to the 'Society of the Artillery', the ancestor of the present Honourable Artillery Company, in December of the same year. That these requests for the use of the Hall were subject to serious consideration we may be sure, for we find that the use of the Hall was denied for an 'Ebru Lecture' on the 19th of September 1586. Probably this lecture was theological, and the Company, having suffered considerable religious persecution, would take no risks.

It appears to have been the practice of the Company to allow their craftsmen the use of the Hall and its precincts for working in, for it was ordered on the 6th of October 1619 that in future no workman should use the Hall. This privilege, however, was revived for workmen of the Company whose houses had been burnt in the Great Fire of 1666. The feasts and banquets pro-

bably became unnecessarily extravagant in the sixteenth century, for in 1585 it is recorded that 'the feast of St. George's Day be cut off and a sermon in church followed by a seemly banquet to be substituted'. Even this seemly banquet appears to have been given up at the beginning of the seventeenth century, for on the 5th of February 1610 it is ordered that there be a 'strict observance of quarterlie dinners, by the neglect of which discords have arisen and brotherly love decreased'. I need hardly say that at the present day brotherly love is fostered and encouraged in a most hospitable manner. Before leaving the social side of the Company's activities mention should be made of the barge which was used to convey the master and wardens to Greenwich at the meeting of Henry VIII and Anne of Cleves in 1539-40, and again in 1543-4 to attend on Henry and Katharine Parr. The Company still preserve the banners and saluting cannon taken from the last of these barges, which was broken up about the year 1860.

With regard to the technical side of the Company's activities, one of their most important duties was the right of search and inspection of arms and armour. For example, under the regulations of 1322, where it is laid down that no armour might be sold if completely covered with silk or other fabric, the right of search and inspection certainly lay with the Armourers, even if the regulations applied to the Linen Armourers, a debatable point which I have referred to before. And this right was maintained in the sixteenth century, and the early regulation was quoted in support of the Company's claim. As we may naturally expect, this right was frequently contested, first by the Blacksmiths, and later by the Cutlers, for the work of both these guilds trenched very closely on that of the Armourers. The Bladesmiths were at one time a distinct gild, but owing to disputes in the year 1515 on the question as to which Company had the right to fashion weapons, they joined the Armourers and subscribed to regulations which, it is interesting to note, are the same rules which governed the Heaumers in 1347. Amongst these we find

That Heaumery and Armour be not putt for sale till it be assayed.

That every man use his own mark and do not counterfeit the mark of another. [The penalties were for the first offence 6s. 8d., for the second 10s., and for the third 13s. 4d.]

That all edged tools be hard at the point, and that no edged tools be sold in inns or privy places.

The amalgamation was, however, found to be unworkable, and two years later the Bladesmiths left the Armourers and joined the Cutlers, but the Armourers apparently retained the right of search in respect of weapons, while the Cutlers confined themselves to domestic knives. The right of search was surrendered in 1789. The Armourers' powers appear to have been wide in jurisdiction, for in 1595 we find it recorded that the Company inspected a number of pieces

imported from overseas, and rejected many because the breast and back plates were too short and too narrow. In 1620 they took action against a smith in Sussex who made up old armour and sold it as new. The offender was examined and eventually handed over to the Guildford justices to be dealt with. All through the sixteenth century the Company's books record 'gratifications' to notable individuals in recognition of their assistance. In 1566, before one of the frequent encounters with the Cutlers' Company over right of search or some kindred matter, some armour is voted to the Recorder, 'to be our friend against the Cutlers'. In 1585 the Queen was evidently incensed at the laxity of the City Companies with regard to the provision of men for the City Watch, and instructed the Lord Mayor to bestir himself in the matter. The Armourers doubtless felt the prick of conscience, for they 'gratified' both Sir Francis Knowles and Sir Francis Walsingham 'for their pains on our behalf'.

Again in 1590 Sir Henry Lee was, I regret to record, 'gratified' in order that he might hinder one Stanley from setting up as an armourer, and received 50*l.* from eight members of the Company. As these individuals could not meet this heavy payment, the Company advanced the money, of which 25*l.* was debited to William Pickering, who was one of the Queen's armourers at Greenwich and became Master of the Armourers' Company in 1608. As Lee was at this time Master of the Armouries, Stanley was evidently considered to be a dangerous rival to the royal craftsmen.

From the first years of the reign of Henry VIII, when foreign or Almain armourers were imported into the Royal Armouries, it is more than probable that many craftsmen were attracted by the military splendour of the courts of Henry and Elizabeth. The tournament was the principal set-piece in all royal functions and progresses, and as far as we can judge from the scanty records of the subject the foreign armourer, at any rate up to the latter part of the century, easily surpassed his English competitor in the making of decorated armour. This influx of foreign armour, for, although some was made by aliens in England, much was imported, was a serious drawback to the craftsmen of this country, and in the reign of Elizabeth petitions to the Crown asking protection for the home market were frequent. The petition of the 13th of July 1590 might almost have been presented to-day under the Safeguarding of Industries Act, for it sets out that the armourers of London had provided tools and appliances and had entertained foreign workmen in their workshops, with the result that the foreigner absorbed their trade, and they particularly state that it is dangerous to be solely dependent on foreign armour in cases of military emergency. This petition is signed by William Pickering amongst other members of the Company.



Fig. 1. English armour, late 16th century
(Tower Armouries, II. 80)



Fig. 2. Detail of breastplate, third suit of
Sir Henry Lee



Fig. 3. Locking gauntlet of second
suit of Sir Henry Lee
(Armourers' Album, Victoria and Albert Museum)



Fig. 4. Locking gauntlet of second suit of
Sir Henry Lee



Fig. 1. Buffe of third suit of Sir Henry Lee



Fig. 2. Buffe of third suit of Sir Henry Lee

(*Armourers' Album*, Victoria and Albert Museum)



Fig. 3. Close helmet of third suit of Sir Henry Lee

Previous to this, in 1580, the question of the skill of English armourers was hotly discussed between Dr. Doul, Master of Requests, and the Master of the Armourers' Company, the latter wagering 1,000*l.* to 100*l.* that English armourers excelled their foreign rivals. Sir Walter Mildmay was asked to hold the stakes, but he called the bet off, for he said that there could be no question as to the superiority of the London craftsmen.

It was probably arising directly out of the petition of 1590 that Sir Henry Lee arranged the trial of armour which is described by our learned Vice-President in *Archaeologia*, vol. li, in which a test is made between a breastplate of Shropshire iron and one of 'Hungere' or Innsbrück metal to the complete discomfiture of the English piece.¹

Besides the right of search and the examination of arms and armour, the Company were ordered to stamp with their mark those pieces that had passed the test, which was generally made by the most powerful weapons in use at the time. In the sixteenth century the test was made by crossbow bolt, and later by pistol and musket shot. M. Buttin,² the learned French authority on the subject, quotes from the 'Ordonnances du Roi', entries in which show there were in France, at any rate, two kinds of proof, the *Demi-Epreuve*, carried out by the *Arbaleste à croc*, that is the small crossbow set by means of a hook attached to the archer's waist, and the proof, *de Toute Epreuve*, carried out by the heavier *Arbaleste à tilloles*; and here it is distinctly stated that the lesser proof should be indicated by one mark and the heavier proof by two marks. We have definite information as to the proof by pistol shot in the seventeenth century in the Verney papers, where the charge of the pistol is stated to be as much powder as will cover the bullet in the palm of the hand.³ Up to the eighteenth century proof was made by *estramacon* or sword blow, which was termed in the fourteenth century *botte casse*.⁴

The first record of proof marks used by the Company is under the date 12th March 1599, when nine members who were gun-makers appeared before the Court and exhibited specimens of their craft. The Court ordered that all muskets and calivers should be proved and stamped with the Company's mark, an 'A' under a crown. In 1590 the charge for viewing and marking a cuirass and helmet might not exceed 2*d.*, and the same fee was charged for marking every six morions. Again, in 1631 the Company were ordered to provide 1,500 armours each month, and because 'divers tinkers and botchers have utterly

¹ *S. P. Dom. Eliz.*, ccxxxii, 92.

² Charles Buttin, *Notes sur les Armures à l'Épreuve*, 1901; ffoulkes, *The Armourer and his Craft*.

³ *Memorials of the Verney Family*, iv, 30.

⁴ Gaya, *Traité des Armes* (Clarendon Press reprint), p. 30.

spoiled many arms armours guns and pikes' it is ordered that the Company prove these pieces and stamp them with their own stamp, an 'A' under a crown (fig. 1). The document goes on to insist that there shall in future be 'one uniform fashion of armour for the Trained Bands', probably the first use of the word uniform as applied to the equipment of the British Army.

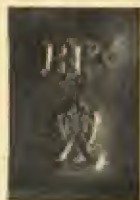


Fig. 1. Hall mark of the Armourers' Company: from no. II. 117, Armouries, Tower of London.

It is a curious fact that, whereas it is not uncommon to find the Company's mark on body armour and helmets, I have never yet seen it or heard of it on weapons and firearms, which must have been produced in far greater quantities.

That this practice of marking armour was of much earlier date we learn from the Regulations of the Heaumers' Gild in 1347, which I have quoted previously, for the members of this gild were ordered to use each his own mark, and serious penalties were inflicted for counterfeiting. It is extremely rare to find definite details respecting the actual *pointon* or stamp used for marking armour; in fact I only know of two such references, one in the archives of Tours under the date 1470,¹ and the other in the Court Books of the Armourers' Company, dated October 1620, wherein Henry Rowlands delivers



Fig. 2. Overstamped testons of Edward VI (British Museum).

to the Court four stamps, two with 'P' for Proof, and two with 'A' and a crown for Armourers. The hammermen who imprinted these marks must have been recognized as highly skilled craftsmen, for sixty years previously in 1560 the Company provided six, two at the Clothworkers' Hall, two at the Session Hall, Southwark, and two at the Merchant Taylors' Hall, to overstamp the testons

of Edward VI. These coins were found to be of base metal, and the over-stamping with the greyhound and portcullis, the badges of Elizabeth, gave the coins a reduced value for currency: portcullis 4½d., greyhound 2½d. (fig. 2). Unfortunately for us the practice of stamping armour with the maker's personal mark fell into disuse about the middle of the sixteenth century, and we therefore have no 'sign manual' on any of the armours produced by the famous Greenwich school which I shall refer to later. There are several references to personal stamps in the Court Books and records of actions and appeals respecting what we should now call the copyright of a mark. In many instances the stamp of the claimant is drawn on the margin, but none of these has up to the present been found upon arms and armour.

¹ *Mém. de la Soc. Arch. de Touraine*, tom. xx, pp. 268-9.

Before considering the products of the most celebrated members of the Company, it may be of some interest to mention the names of those members who are notable in a lesser degree.

John Richmond, who was Master in 1547, was a maker and purveyor of armour on a large scale and must have been a man of substance, for, as I have mentioned before, he purchased some of the Company's land in Farringdon Street to pay a fine enacted on them. He also gave to the Company the splendid Richmond cup,¹ one of the finest surviving examples of City plate, to be used for drinking the health of the Master 'until a better cup may be found'. He was elected alderman and sheriff of the City, but did not serve and was fined 200*l.* and imprisoned for nine days for contumacy.

Henry Pitt, 'the Queen's Majesty's Man', was one of a family of famous gun-founders, of whom Thomas Pitt produced the five brass cannon made for Charles II when prince, which are now in the Tower collection.

Matthew Derricke was authorized by Edward VI to set up a shop 'to teach Englishmen to make armore'. His father, Robert, had been a hammerman in the Royal Armouries in 1530 and was Yeoman of the Armouries. A relative was a goldsmith in London in the sixteenth century.

John Cooper was Yeoman of the Armouries in 1620 and became Keeper of the King's Brigandines in 1627. Sir Hilgrove Turner, writing in 1799, mentions J. Cooper, probably a descendant of John Cooper, as the last of the Tower armourers.²

John Rivett, brasier, was Master in the seventeenth century. He is known in history as having purchased Le Sueur's statue of Charles I when parliament ordered it to be melted down. We all know the legend that he sold brass knives and other objects, publicly to the parliamentarians as a proof of his good faith, and secretly to the King's supporters as souvenirs. He eventually dug up the statue from his premises in Seven Dials and restored it intact. It is somewhat of an antiquarian mystery that none of these examples of Rivett's diplomacy and loyalty has ever come to light in the 'market for antiques'.

Morley, whom I have mentioned at the beginning of this paper as the enthusiastic historian of the Company, states that Thomas Stevens made the armour for the Pilgrim Fathers, but after an exhaustive search among the records I can find no entry that bears out this statement, though Stevens is frequently mentioned during the first years of the seventeenth century.

Henry Marriott, Master in 1828, is interesting only because he was the last member of the Company to manufacture armour. He invented and advertised a process for producing armour, probably some form of stamping

¹ Hubert Dynes Ellis, *Ancient Silver Plate*, vol. i (privately printed for the Company).

² J. H. T., *A Short Account of Ancient Chivalry*, 1799.

in moulds, and copied the Lee suit, which I shall refer to later. He provided a gauntlet to take the place of one missing on this suit, and engraved it with the crest of the Company.

And now I come to the two most distinguished members, who I take leave to assert will rank with the finest craftsmen of Europe in the making of armour.

The first of these is Jacobe Halder. We first hear of him in a bill of payments dated 12th July 1559, wherein he is described as hammerman in the Royal Armouries at Greenwich.¹ On 4th August 1561 he was received as member of the Armourers' Company with the designation 'stranger' which undoubtedly meant foreigner. Four other workmen from the Royal Armoury were received at the same time and the five craftsmen were evidently considered to be of some importance, as the Master entertained them to dinner and ordered a gallon of wine for their enjoyment. Halder does not appear to have held any office in the Company, but was a regular attendant at the dinners and feasts. The last mention of his name in the Court Books records a payment of 1*l.* search money to 'Jacobe' on 30th March 1571. We must turn now to other documents to trace his subsequent history. In 1590 Jacobe is mentioned as Master Workman in the trial of armour which has been referred to before, and here it should be noted that he is the only armourer working in England at this period who bears that Christian name, and as I think will be shown conclusively from the following records, his full name was Henry Jacobe Halder. On 24th June 1598 Henry Halder was given the life appointment of keeper of the handguns, demihakes, curriers, arquebusses, and dags in the Tower in succession to Mr. Fowkes.² In June 1598 John Lee, clerk of the armoury, writes to Sir Robert Cecil, 'Mr. Fowkes had a patent for keeping muskets, calivers, and dags. On his death the earl of Essex, Master of the Ordnance, appointed one Jacob to his place. On taking remain 730*l.* or better was found to have been wasted by Mr. Fowkes.'³ Halder evidently died shortly after his appointment, for on 4th August 1599⁴ we find in a letter from W. Cholmly, who bears the untranslatable nickname *Klerikos Klerikotatos*, written to Edward Reynolds, secretary to the earl of Essex, 'My Lord has bestowed on me the office in the Tower which Henry Jacob lately held'. So here we have three documents all referring to the same appointment in which occur the names Henry Halder, Jacob, and Henry Jacob, and all these obviously refer to the same individual. We will now turn to the productions of the Royal Armoury in order to attempt to trace some examples of Halder's work. I need hardly refer those of our Fellows who are interested in the subject of armour to the valuable Armourers'

¹ *S. P. Dom. Eliz.*, sub anno.

² *Hatfield Papers*, pt. viii.

³ *Ibid.*

⁴ *Ibid.*, pt. ix.

Album which, on the advice of our learned Vice-President, Viscount Dillon, was purchased in Paris for the Victoria and Albert Museum. Lord Dillon has written several papers on this album in the *Archaeological Journal*¹ and elsewhere, and also produced a book of coloured reproductions of some of the drawings for the Armourers' Company.² All the drawings are also described minutely in the fourth volume of the late Sir Guy Laking's work on European armour. Though Halder is only mentioned as master workman in 1590, he must have been the ruling spirit in the armouries, for Erasmus or Asamus Kirkenor, Chief Armourer, whose name still appears in the royal accounts, had been continuously employed since 1519, and by 1590 would be past active work.

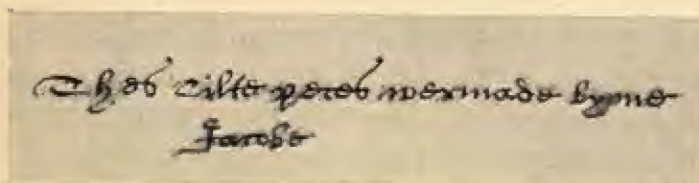


Fig. 3. Title of drawing of first suit of Sir Henry Lee (*Armourers' Album*, Victoria and Albert Museum).

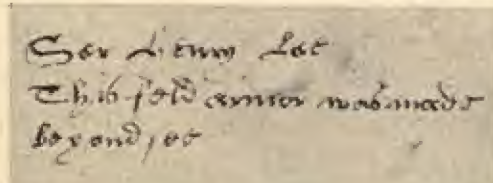


Fig. 4. Title of drawing of first suit of Sir Henry Lee (*Armourers' Album*, Victoria and Albert Museum).

In the Album to which I have referred the only armourer's name mentioned is Jacobe, and this occurs on two pages of drawings, the one of the earl of Worcester's armour and the other of Sir Henry Lee's first suit. The inscription runs, 'thes tilte peces wer made by me Jacobe' (fig. 3). I maintain that this must be in Jacobe Halder's own writing, for a clerk would never have inserted the word 'me'. If these inscriptions had been merely clerical entries, we should surely have found the names of other armourers mentioned, but the name Jacobe alone appearing suggests that he was particularly anxious that there should be no mistake on the subject of authorship of these pieces at any rate and that he was a craftsman of importance. There are two distinct hands in the titles of the drawings, and the four specimens given in the illustrations before us appear to be by the same writer, who I suggest was Jacobe Halder. At any rate I contend from the evidence that the mysterious Jacobe whose identity has baffled all students of arms and armour for the last twenty years can now be definitely recorded as Henry Jacobe Halder, Queen's Armourer, Master Workman at Greenwich, Keeper of the Queen's handguns, and member of the Armourers' Company. Probably he was of Dutch or German origin³, for the inscription on fig. 4, 'this feld armor was made beyond see', suggests the

¹ Vol. lii.

² Viscount Dillon, *An Almain Armourer's Album*, Griggs, 1905.

³ Possibly James Halder, 'from the Dominion of the Emperor', who took out denization papers, 30 April 1572 (*Pat. Roll.*, 14 Eliz., pt. 8, m. 4; Page, *Letters of Denization*, Huguenot Soc., vol. 8).

spelling of a foreigner rather than that of an Englishman, but he certainly settled in England and died here after thirty years in the Royal Service. I need but make a passing reference to the late Dr. Wendelin Boeheim, Custos of the Vienna Museum, who, with that Teutonic acquisitiveness to which we have so long been accustomed, endeavoured to show that Jacobe was one Jakob Topf, who worked at Gratz. Boeheim's evidence was based merely on the fact that Topf was absent from Germany during the period when the armour illustrated in the Armourers' Album must have been produced; but none of the armour known to be by Topf bears the slightest resemblance to the productions of the Greenwich School. I trust, therefore, that we may consider the long-standing 'Topf' legend to be decently buried for all time.

William Pickering, the other great master of the Greenwich school, is first mentioned in the Company's books under July 1588, where he is cited as a master craftsman. He was evidently a man of means, for he was responsible for the larger portion of the money with which Sir Henry Lee was 'gratified' in 1590, as I have mentioned before. He was Renter and Upper Warden of the Company in 1603, and was assiduous in carrying out all the onerous duties of these offices. In 1608 he was elected Master. We first hear of him as employed in the Royal Armouries in 1591, and in 1604 he is mentioned as Master Workman. I am not quite clear as to this title. It may be that when a craftsman had reached a certain position in the armouries he was classed as Master, and that therefore there may have been more than one master at the same period, or, what I think is more probable, Pickering succeeded Jacobe Halder in 1598, when the latter became keeper of the Queen's handguns. If this is the case he was a pupil and follower of Halder and continued the same school of design in which Halder had excelled. In the *State Papers Domestic* under the date 1614 we find a warrant to pay to Wm. Pickering 200*l.*, the balance of 340*l.* for armour gilt and graven for the late Prince (Prince Henry).¹ There is no drawing of such an armour in the album to which I have referred so often, but the splendid suit at Windsor, which from the contemporary portrait at Windsor we can be sure was undoubtedly made for Prince Henry, approximates so nearly to the drawing of the armour for George Clifford, earl of Cumberland, that we may assume that this is the suit referred to and that it was made in the Royal Armouries under Pickering, probably about the year 1610 or 1611.

All through the *State Papers Domestic* are entries of payments to Royal armourers which prove that, although working in the armouries, they were allowed to take private contracts and receive pay for their productions. Pickering died on 25th December 1618, and was buried at Greenwich.

Without wishing to depreciate our two greatest armourers in any way,

¹ *State Papers Sign Man.*, vol. iv, 29.

I am inclined to think that Erasmus Kirkenor¹ may have been the founder of the important school of English armourers which under his guidance for nearly seventy years eventually culminated in the designs of the splendid productions of the Greenwich School, for he is mentioned as making book-clasps and other ornaments, which shows that besides being an armourer he must have been a skilled gold- and silver-smith.

There are legends quoted in guide books of the eighteenth and nineteenth centuries that the gilt armour of Charles I in the Tower was presented to the King either by the City of London or by the Armourers' Company, but I am somewhat relieved to have been unable to find any mention of such a presentation in the records of the City or of the Company, for the suit is poor in construction and weak in decoration and would have reflected but little credit on the Corporation and none on the Armourers' Company. The Armourers certainly had a store of service armour which was probably dispersed after the Restoration, but in 1589 they do not appear to have had anything of a decorative nature beyond one George in armour in the hall, and in the chapel in St. Paul's two Georges in armour, and one armour given as a fine by one of the members. There is no mention of any armour among the Company's possessions in the eighteenth century till 1768, when William Carter, who was Master in 1767, presented both the full armour of Sir Henry Lee and a locking gauntlet of another suit also of Sir Henry Lee. In 1784 Thomas Harrison presented what was termed a 'brass' suit. In 1812 it was noticed with regret that the brass armour was associated with a 'brass hat', and Henry Marriott, whom I have mentioned before, was commissioned to make 'a more suitable helmet'. Marriott borrowed both the Lee suit and the brass suit, and made copies of them which were exhibited to the great admiration of all who saw them. It was probably due to the fact that he was Master in 1828 that the Company bought his copies at high prices.

In 1855, when the Hall was redecorated, the copies were sold for a nominal figure to a dealer in theatrical costumes. Harrison's brass suit gradually fell into decay and about thirty years ago was disposed of as lumber, only the toe-piece of one of the sollerets remaining to-day. All the remaining armours and weapons now in possession of the Company have been purchased, bequeathed, or presented during the nineteenth and twentieth centuries.

The only armour, therefore, of historic interest is that of Sir Henry Lee. The drawing of this suit is shown on page 28 of the Armourers' Album above referred to, and is the third suit which is illustrated under the name (pl. II, fig. 2). The inscription reads 'Ser Harry Lea Mr. of the Armoure' (fig. 5). In the drawing the bands of decoration are shown coloured red, green, and gold,

¹ Royal Armourer, 1519-93, Chief Armourer, 1544.

but the suit itself shows no sign of enamelled colours, the engraving being only gilt. The evidence as to the original ownership is purely circumstantial, but is none the less interesting.

On 10th June 1718, Thomas Hearne, the Oxford antiquary, walked over to Ditchley and back, a matter of some thirty-six miles, and, after inspecting all the pictures and other treasures of the house, states: 'In one of the outhouses I saw strange armour which belonged to the ancestors of the Earl of Lichfield, some of the armour was very old'.¹ This armour was evidently on the point of being disposed of, for in the Ditchley accounts of the same year appear payments of one penny per diem for nine days to a man 'for getting old armour ready to be weighed'. Later on we find in the same accounts a receipt from Mr. Mott, the brazier, of 7*l.* 4*s.* 6*d.* for just over 14 cwt. of old armour at



Fig. 5. Title of drawing of third suit of Sir Henry Lee (*Armourers' Album*, Victoria and Albert Museum).

10*s.* per cwt. Lord Dillon has calculated that, taking the average weight of a suit as about 70-75 lb., the price of the armour under consideration was about 6*s.*, or, to use 'sale' figures, 5*s.* 11½*d.* The leather from the armour straps, linings, and saddles was cut up for nailing up fruit trees.

The problem before us is how this complete armour and also the locking gauntlet came into the possession of William Carter, Master of the Armourers' and Brasiers' Company of London, who presented it to the Company in 1768. There are certain clues which may be only coincidences, but may, when leisure and time allow, be worth following up. The locking gauntlet (pl. III, fig. 4) is of the same design as Sir Henry Lee's helmet now in the Tower Armouries, which is figured in Grose's *Military Antiquities*, 1801 (vol. ii, 350), and is described as the property of Mr. Rawle, accoutrement maker, in the Strand. The three clues which I venture to put forward are all perhaps rather vague.

First, a certain William Carter was mayor of Woodstock in the early part of the nineteenth century, but I have not yet been able to connect him with William Carter who presented the armour and the gauntlet to the Company. Was William Carter, Master of the Armourers' Company, a relative of William Carter, mayor of Woodstock, or were they one and the same individual? Ditchley is within easy distance of Woodstock, and the elucidation of this might easily clear up the mystery of the provenance of the armour.

¹ *The Remains of Thomas Hearne*, vol. i, 64.

The second clue is that Mr. Mott is described as being a brasier. Had he any professional connexion with the Armourers' and Brasiers' Company?

The third clue, but more vague than the other two, is that accoutrement dealers in the eighteenth and early nineteenth centuries also purveyed town swords and buckles which were often ornamented with cut steel, a thriving industry at Woodstock in the eighteenth century. Could Rawle's predecessors have bought the armour in the course of trade with Woodstock town and have sold one suit and gauntlet to Carter and eventually sold the helmet to Bernal, from whose sale it was bought for the Tower?

The Lee suit is complete except that the two upper lames of the cuisses are wanting, but the slotted holes on the upper margins show that these were removable at will. In the drawing in the Album these extra pieces are shown separately. Possibly there are lames missing in the taces, for the design does not register very accurately (pl. II, fig. 1).

The long-necked gorget is also English in feeling, and the two embossed projections on the pauldron made to give play to the cuirass straps underneath are also found on English armour of this period (pl. III, fig. 1). There is a fixed pin to hold the left pauldron to the cuirass, the pin on the right being pivoted to give greater freedom of movement. The breast and back are joined by a hinged lug which can be let out an inch or more. The helmet is typically English, with the fine outward sweeping mezail which occurs also on many of the rank and file helmets of this period in the Tower collection (pl. IV, fig. 3).

The left-hand gauntlet is wanting, and was replaced by Henry Marriott, about the year 1828, by a weak copy of the right-hand gauntlet, ornamented on the back of the left hand with the crest of the Armourers' Company. It is only of interest as probably the last piece of armour made by a Master of the Company. The sollerets are very small, 11 in. over all, which would give the wearer's foot, allowing for a shoe, about 8½ or 9 in. This is one of the noticeable features of all armours of this period.

Our [late] Fellow Mr. Murray Kendall informed me that at the present day in South America it is by no means unusual to find horsemen taking size 6 in boots, owing to the fact that they never walk, and literally mount their horses to cross the road.

The bands of engraving are extremely fine in workmanship, and consist of a flowing border of pines and pomegranates gilt on a dotted background. The style of design employed on the suit is somewhat similar to that on the Smythe armour in the Tower, but not nearly so elaborate. If I am right in my assumption that it was made for Lee's last tournament, it is obvious that at the age of sixty he would not have incurred great expense in its decoration. On one of the bands which decorate the breastplate, on the steel shoulder-

straps which join the cuirass, on the turner-joints of the brassards, and on the fingers of the right-hand gauntlet are the letters AV, forming part of the decoration (pl. III, fig. 2). These stand for Ann Vavasour, natural daughter of Sir Henry Vavasour and Gentlewoman of the Bedchamber to Queen Elizabeth in 1580. In 1590 John Stanhope, writing to Lord Talbot, says 'Mistrees Vavasour flourisheth lyke the lyly and the rose', and in the same year her name appears in the Ditchley accounts. She appears to have been 'reading lady' to Sir Henry Lee after the death of his wife. Sir Henry Lee resigned his office as Queen's Champion on the 17th of November 1590, at the age of 60, the same year in which Ann Vavasour's name first appears in his private accounts. Now even such a favoured courtier as Lee would, I contend, hardly venture to appear as the Queen's Champion with the monogram of another woman on his armour; such a tactless proceeding would surely have entailed serious Royal displeasure if nothing worse. His successor as Champion, George Clifford, earl of Cumberland, and also Sir Christopher Hatton, captain of the Royal Bodyguard and Lord Chancellor, both show, tactfully and loyally, the Queen's monogram on their armours, the former now in America and the latter at Windsor. I suggest, therefore, that this suit was made for Lee's last tournament, when Elizabeth would not notice his indiscretion, for he took off his armour before reciting his well-known resignation poem,¹ and I further suggest that this suit was made for him by his most highly-skilled master workman at the Armouries, Henry Jacobe Halder.

The locking gauntlet belongs to the second suit illustrated in the Album, and is decorated with a series of interlaced circles which form crosses recessed and engraved. The whole was russeted and gilt (pl. III, figs. 3 and 4). This type of gauntlet was known as the 'Forbidden gauntlet', but it must have been in common use during the sixteenth century, for there are even now several examples in existence, including those of Henry VIII and Sir Henry Lee, who would hardly have had gauntlets of this type made if their use in the tournament was forbidden. The style of design is earlier than that of the third suit, and more nearly resembles the recessed and engraved decoration on the Leicester and Hatton armours.

The falling buffe was in the Londesborough sale of 1888, and was purchased at the Brett sale by the Company in 1895. It forms part of the third suit in the Album which I have noticed above as presented by William Carter (pl. IV, figs. 1 and 2).

There is only one more mystery in connexion with these armours to be cleared up. How was it, if these pieces are part of the Ditchley store which was sold as old iron, that they are at the present day in wonderfully good

¹ Nicolas' *Progresses of Queen Elizabeth* and Hearne's *Remains*, iii, 262.

preservation? There are no important pieces of the Lee suit missing, nor are there, as we might expect, portions of other suits associated. The locking gauntlet bears much of its original colour and gilding, and the helmet at the Tower is perfect, even to the original lining, which is still preserved. If these came from Mr. Mott, he deserves our gratitude and respect for sorting out his 14 cwt. of armour and assembling the suit properly, and I think we may also spare a small modicum of thanks to the man mentioned in the Ditchley accounts, who was paid one penny per diem for 'sorting out the armour', for he evidently did his work thoroughly and with judgement. These priceless possessions of the Armourers' Company are now the only examples of the Greenwich school in England, apart from those in one or other of the national collections. The portions of the Scudamore and Compton suits are, with regrettable restorations, in the Metropolitan Museum, New York, and the magnificent Cumberland and Pembroke suits have been purchased by private collectors in America at prices which have never been approached in the history of armour sales.

It may be of interest to learn that when the Lee suit was carefully examined and the dirt of ages washed off, several parts were tested by Shore's scleroscope, which gives hard steel as 95 and mild steel as 45. Most of the pieces reacted at from 40 to 45, but the visor gave 55, showing that the expert armourer considered the needs of his patron in giving special protection to what, in jousting with the lance, was the most vital part. And here I may again allude to Sir Henry Lee's well-known test of armour which I have mentioned previously. We learn that, on the request of a gentleman in Shropshire, two breastplates, the one of Shropshire iron and the other of 'Hungere' or Innsbruck iron, made in the Royal armouries at Greenwich, were tested by pistol-shot, with the result that the English metal was pierced and the foreign metal only dented. Now we do not know who made the breastplate of Shropshire iron. It may have been made by an armourer less skilled than the Royal craftsmen, or it may have been made in the armouries. If the former was the case, it was hardly fair to pit it against the production of the most expert armourers of Europe. If the latter, I fear there may have been some likelihood of the very close corporation at Greenwich, who were used to importing metal which they had found satisfactory for nearly a hundred years, taking particular care that the English breastplate was so forged that it would not equal the temper of the foreign piece. The craftsman is the same in all ages and in all countries, and the last thing he approves of is experimenting with new materials, whether it be armour or building materials.

In conclusion, I must express my thanks to the Master and Wardens of the Armourers' Company for the very kind assistance they have rendered to me in the preparation of this paper.

DISCUSSION

Mr. J. G. MANN inquired the purpose of the *Jacobe MS.*: was it a book of fashion-plates or an inventory (like that of Charles V at Madrid), for keeping a record of armour stored? The phrase 'made beyond sea' suggested that *Jacobe* worked abroad: what did the author consider the nationality of the ornament on the suit in question? It had the appearance of Augsburg, and *Jacobe*, if a foreigner, might have come from that centre. Prince Rupprecht of Bavaria had two similar MSS. of armour, not so well drawn but intended for the same purpose. Decoration was no test of armour, as patterns circulated, and English craftsmen could use German designs. The Essex suit showed triple scales, which appeared both in German and Venetian suits; but the English type described by the author had no German affinities.

Mr. MURRAY KENDALL thought that the Greenwich school must also have undertaken mass production of armour, as troops were then being armed in a uniform manner. About the time when the tests were made, English iron production increased enormously: new methods were being introduced, and the work at Greenwich would have affected the production of iron. Forests had then to be preserved, and coal was used for smelting. He would like to hear something about the cheaper suits, made according to regulations.

Mr. HOPKINSON, as Past Master of the Merchant Taylors, was interested in the alleged descent of that company from the armourers. He should be proud of such a connexion; but in spite of the efforts of Mr. Trice Martin and others, no proof had yet been found. The linen armourers had to deal with the suits when the armourers had finished with them. There was constant reference in the calendars of patent rolls to *haubergiers* (linen-armourers) in the Tower; and they were otherwise described as 'stuffers of the King's armour'.

Mr. QUARRELL said it was on record that Conrad von Offenbach went to the Tower in 1700 to inspect the records and saw the armour there. He wrote a careful description of the suits of Henry VIII and his predecessor, the latter's having been 'made for a masquerade'; and noted that the Tower was the only place in which he had seen the small arms so well displayed.

Mr. PLOWMAN said the *Jacob Topf* problem had at last been solved, and inquired the origin of the suit in the possession of the Honourable Artillery Company. It was peculiar in having the elbow-caps in two pieces, and he had always imagined it to be of Greenwich manufacture.

Mr. CRIPPS DAY thought the documents showed that there were never more than thirty or thirty-five armourers employed at Greenwich; they were under the Crown, and received quarters and livery. Till Elizabeth's time they were almost entirely employed on armour for the king; and it was probable that Henry VIII, who could not get such armour as Maximilian had abroad, started the Greenwich school in 1510 to meet his own requirements. In Elizabeth's reign it was possible for noblemen to have armour made at Greenwich, and it was issued by warrant under sign manual. There was little evidence that the school ever made wholesale for the army. The last suit shown on the screen looked like the one in which Charles I appeared in Vandyke's pictures.

The PRESIDENT said the discussion had been too short to discuss some interesting points, whether, for instance, armour was the ornamental appanage of great personages. There seemed to have been certain irregularities in both the companies connected with armour; and the history of the Greenwich school, as elucidated by Mr. Ffoulkes, had formed the basis of a very interesting discussion.

Mr. FFOULKES considered that the *MS.* was a sample-book shown to patrons, who had alterations made to their own satisfaction. It was quite possible that armourers travelled abroad to study foreign fashions, and the best-known names were certainly continental, such as Halder and Kirkenor. The Augsburg feeling in their productions might be thus explained. *Haubergier* was probably a shirt-maker, the name continuing after the *hauberk* had passed out of use. It should be noted that *Jacobe* had continuous employment in England and remained long in the country.

III.—*A Saxon Village at Sutton Courtenay, Berkshire (Second Report).* By
E. THURLOW LEEDS, *Esq., M.A., F.S.A.*

Read 18th March 1926

SINCE the publication of the first report¹, which included all the work carried out on the site of the Saxon village at Sutton Courtenay down to the end of 1922, further excavation has resulted in the discovery of eight² more houses in the same area as those previously described, and two others a little distance away. In addition, three Bronze Age circular ditches have been observed and partly explored, as well as one or two more pits of the same period. Above one of the circular ditches were found traces of Saxon houses, in one case consisting of a pavement of large limestone blocks.

Once more I have to record a deep debt of gratitude to Mr. R. T. Lattey. His constant assistance, coupled with occasional help from other friends, amongst whom I should wish particularly to mention Mr. H. F. Biggs, M.A., has contributed very materially to such results as have been attained.

At the time of writing the main portion of the site unexplored between the eastern side of circle B (plan, fig. 1) and the eastern limit of the gravel-pit and north of house XV has been almost completely removed without producing any further remains, but since at this point the ground begins to slope rapidly down towards the Thames, it was hardly to be expected that further houses would appear in this direction. Apart, therefore, from possible discoveries in the area of the Bronze Age circles A and B, this part of the site may possibly be regarded as exhausted, but there are indications that the village may have extended to the west side of the Milton road.

BRONZE AGE

Further evidence of the occupation of the site in the Bronze Age has been acquired. In digging exploratory pits along the line on which stood houses XII–XV, a deep deposit of filling, red in its lower layers, was encountered at one or two points east of house XIV. This filling eventually proved to be that of a large, wide, circular ditch (fig. 1, circle B). Its greatest depth was between $4\frac{1}{4}$ and $4\frac{3}{4}$ ft. Its width was divided into three sections. From each

¹ *Archaeologia*, lxxiii, 147.

² A ninth discovered before this report went to press has been included.

side the ditch, starting at a depth of 12 in. below the cultivated surface, sloped gently down for a distance of about 8 ft. to a depth of 25 in. The middle portion, some 10 ft. across, starting from this 25 in. level, fell 6-9 in. in 1½ ft. of width, after which the sides of the ditch sloped gently down until close to the middle they again fell rapidly away to the bottom. In all, the ditch, if the outer sections were contemporaneous with the middle one, was some 24 ft. wide. In a section of the trench exposed later in the north-west quadrant the outer gentle slope was lacking. The diameter of the circle from the middle of the ditch measured 90 ft., so that the ditch enclosed an area 66 ft. in diameter. Though it was opened at several points, very few remains of any kind were discovered. They consisted of fragments of thick Bronze Age pottery, occasional flints, mostly with white or bluish-white patination, and a few broken animal bones. One white-patinated flint scraper came from the very bottom of the ditch (pl. v, fig. 2, *g*). At one point two fragments of human skull came to light.

It is evident that the circle corresponds to those explored at Standlake by Stephen Stone in 1857 (*Archaeologia*, xxxvii, 364 ff.), and formed the ditch surrounding a hut or collection of huts. It might, therefore, be expected that some indication of occupation would be forthcoming within the circle, but considerable work at the centre only revealed a perfectly unintelligible series of shallow excavations from which were recovered several flakes, cores, &c., of white or bluish-white patinated flint of all sizes, one almost knife-shaped, 3½ in. long (pl. v, fig. 2, *d*).¹ Traces of a charcoal-filled excavation were revealed close to this spot quite recently, but exploration was impossible.

Subsequent exploration in the region of pits C and D (see *Archaeologia*, lxxiii, 150, fig. 2) proved them to have lain within a similar circular ditch of about the same diameter. A third circle, much smaller, 30 ft. in diameter, with quite a shallow trench, 1½ ft. deep, came to light in the exploration of house XVI (see *infra*, p. 70).

Two pits of the class described in the earlier account have furnished a few remains:

Pit N (pl. v, fig. 2, *e, f, h, i*). More than half of this pit, originally 3 ft. in diameter, had been destroyed before exploration, but even so it produced, in addition to numerous pieces of flint flakes of the usual bluish-white patination, two scrapers, one 1½ in. in diameter, the other about 2 in., of a domed type with large serrations round its edge like that found in pit G (see previous report); lastly, a celt of olivine-dolerite, very much pitted by weathering, but with faint traces of polishing still preserved. It measures 4½ in. in length, 2½ in. in width,

¹ Another long flake, a casual find, is shown in pl. v, fig. 2, *c*.

and $1\frac{1}{2}$ in. in thickness, with a fairly thick butt and a flattish oval section.¹ The usual small admixture of Saxon sherds was present in the upper part of the pit.

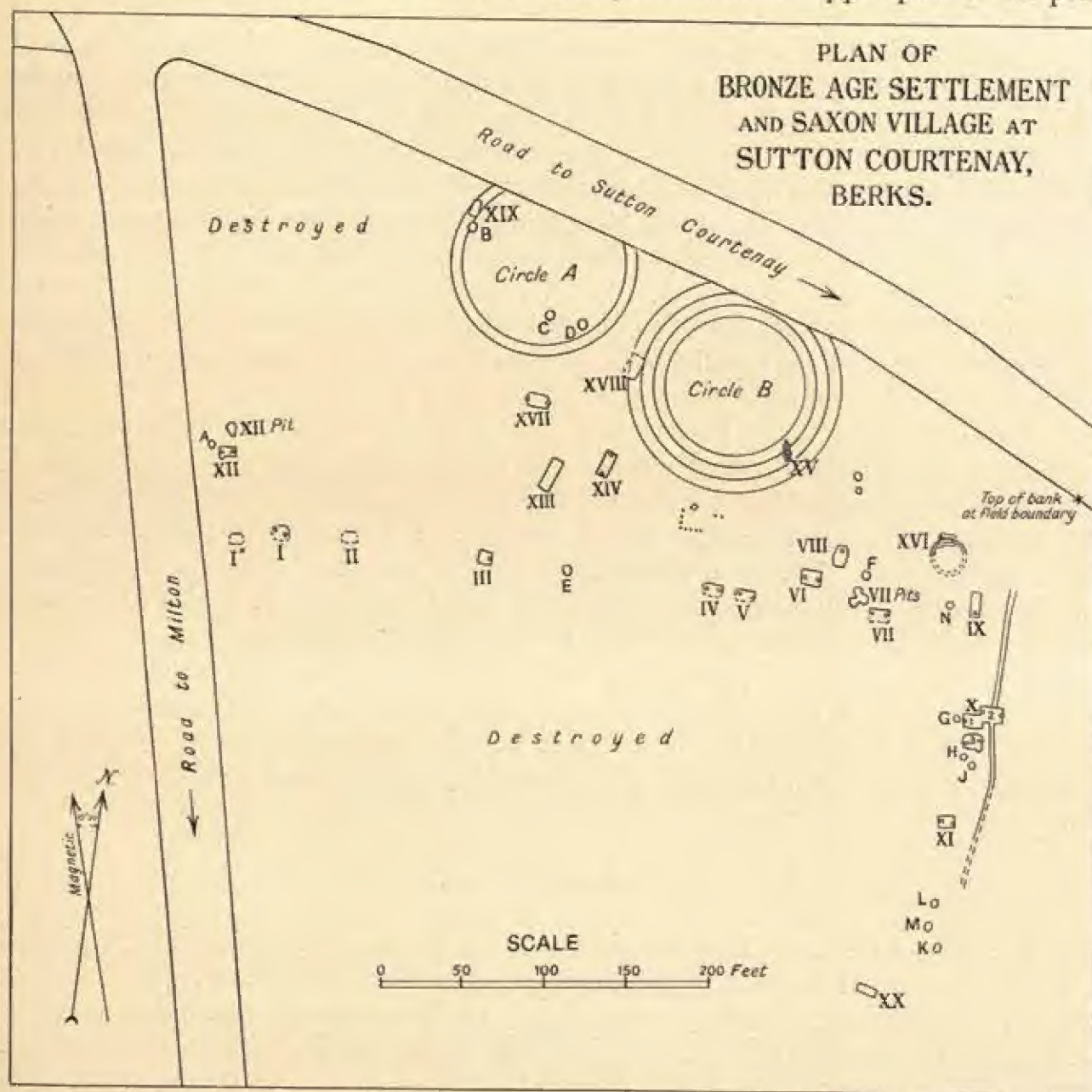


Fig. 1. Plan of the Saxon Village, Sutton Courtenay.

Pit O. $2\frac{1}{4}$ ft. deep, $2\frac{1}{4}$ ft. in diameter. At a depth of 18 in. lay a large piece of fine-grained grey sandstone, 11 in. long, $5\frac{1}{2}$ in. wide, and 3 in. thick. It has

¹ Dr. K. S. Sandford, who kindly made certain experiments in order to discover whether the change of surface was due to chemical agency or fire, has found a fragment of a similar celt identical in material and condition at Hackpen Hill, Wilts.

been worn away by use to a concave surface on both large faces: one of them is scored with two long furrows tapering at either end; one narrow edge has been highly polished.

Above this 'grindstone' were scattered animal bones of ox and sheep (?), including three consecutive cervical vertebrae. Three small abraded sherds, all Saxon, lay above or at the level of the stone, by the side of which was another stone burnt red. This pit seems to range with pits L and M, as possibly of Saxon date or re-used in Saxon times.

Towards the northern end of the Bronze Age ditch on the east side of the site (see previous report) the workmen recovered two stilettos or daggers made from the leg-bones of deer (?) (pl. v, fig. 2, *a* and *b*) with one end cut and sharpened to a point. The condition of the bone compared with that of bone objects of unquestionable Saxon date proves that they belong to an earlier period, and thus to the age of the ditch itself.

By kind permission of Professor F. M. Stenton, of Reading University, I am here able to include another interesting Bronze Age find, a vase (pl. v, fig. 1) which came to light in the pit adjoining Drayton East Way on the west side of the Milton road. It accompanied a skeleton interment in a grave close up against the road. The vase measures $5\frac{1}{8}$ in. in height and $4\frac{7}{8}$ in. in diameter, and is decorated all over with short diagonal incisions. In point of form it may be regarded as a cross between the beaker and food-vessel.

A polished axe of a fine-grained pale green schist was found by the workmen, in December 1926, in the remains of a Bronze Age ditch some 10 yds. west of house XX. It is $4\frac{1}{4}$ in. long, $2\frac{3}{4}$ in. wide, and $1\frac{1}{4}$ in. thick. It is of the thin-butted type, and in form resembles Evans, *Ancient Stone Implements*, fig. 59.

SAXON PERIOD.

House XII (fig. 2). The surmise that the houses along the line numbered I to IX might not represent the limits of the village in a northerly direction was proved to be correct by the discovery, immediately after the previous account of these excavations had been finished for publication, of a house close to the Milton road, 45 ft. north of the hypothetical house I* and 59 ft. from the west side of that road. It proved on excavation to have been orientated almost due east and west, and to measure $13\frac{1}{4}$ ft. in length by $9\frac{3}{4}$ ft. in width. The ground-plan was approximately rectangular, the corners being rounded off and a slight bulge being noticeable in the north wall. The floor of the house lay 2 ft. 3 in. below the surface of the field, the gravel-wall measuring 1 ft. 9 in. in height. In the south-west corner this wall was interrupted by a doorway, to

which access was obtained by passing down a slope worn into twisting steps and then crossing a gravel threshold, 1 ft. high near the walls, but worn down to 9 in. at the middle. Just outside the threshold a hole 6 in. deep had been formed by displacement of the gravel in wet weather. The condition of the gravel threshold clearly showed that it must have been protected by a wooden or other threshold bar.

Around the walls of the house, at a distance of 1 to 2 ft. from the walls, several large stones with flat tops and of varying sizes were disposed in

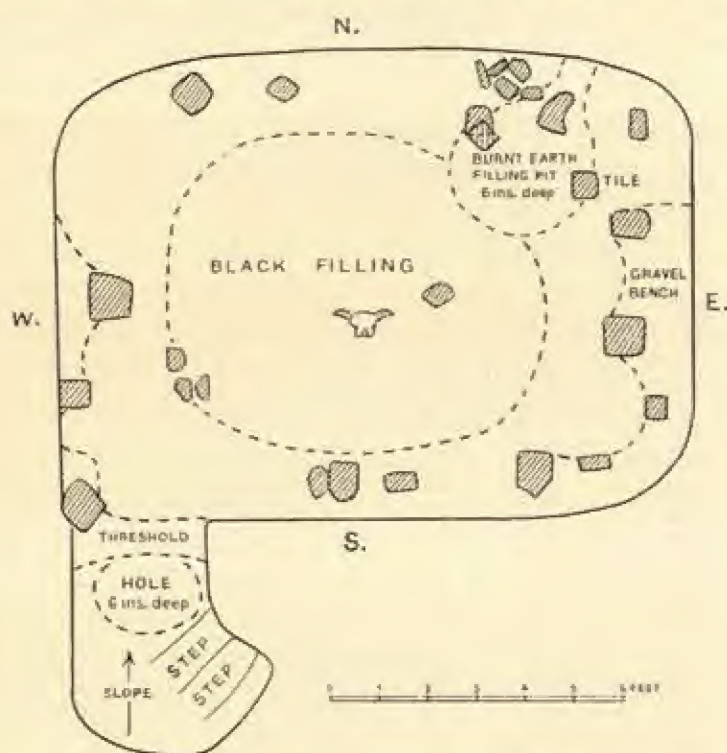


Fig. 2. Plan of House XII.

a manner very reminiscent of the bank or bench in the Athelney cottages, to which allusion was made in the last account, and the likeness was heightened by the fact that along part of the east side and in the south-east corner, as well as along the southern half of the west wall, these stones formed the edging of a bank about 6 to 9 in. high. In the north-east corner was a well-marked circular burnt patch, $2\frac{1}{2}$ ft. in diameter, which proved to be the upper part of a pit, 6 in. deep, filled with burnt soil. From the north-east quadrant of this circular pit a narrow trough extended to the northern wall of the house, as if some flue had been constructed in a direct line with the draught passing across the house from the door. At a height of 15 to 18 in. above this burnt patch several large stones and part of a Roman tile appeared to have

belonged to a hearth subsequently constructed at a somewhat higher level, for in no house previously excavated were the signs of the gradual raising of the floor-level above the original gravel by the accumulation of charcoal, mud, and debris of food more patent than in this house.

Along a strip varying in width from $3\frac{1}{2}$ ft. at the east end and $2\frac{1}{2}$ ft. at the west end to 2 ft. along the north and south walls the filling was composed of a mixture of earth and gravel in which broken bones occurred very sparsely, while the centre of the house within this strip was filled to a height of $1\frac{1}{2}$ ft. from the floor with a fine gritty material mixed with charcoal, throughout which broken bones occurred with the greatest frequency at every level, jaw-bones, broken and split limb bones, broken ribs, &c. At the centre of the original gravel floor lay the complete hinder portion of the skull of an ox complete with horn-cores, a good indication of the rapidity with which the debris must have accumulated. This skull, along with the bones of the dog found in house VII, has been presented to the British Museum (Natural History).

The entrance-recess was filled with the stiff red earth which up to this time had only been met with in the Bronze Age pits. Similar material was encountered in a strip about a foot wide at the north-west corner, so that possibly both this strip and the entrance hole may have formed part of an earlier Bronze Age dwelling.

A few Saxon sherds, a fragment of a pot-ring, an iron awl $3\frac{1}{8}$ in. long (pl. VI, fig. 1), a toggle¹ $3\frac{1}{2}$ in. long, with two perforations, made from the tip of an antler, parts of antler branches sawn off from the stem, and part of a double-pointed bone pin were discovered in the filling (pl. VII, fig. 2).

Pit north of house XII. Some 15 ft. immediately north of house XII we explored a pit of the form shown in fig. 3. It measured 6 ft. in diameter from east to west, and probably a little more from north to south, part of this side having been demolished before we began work. The pit was bowl-shaped and $4\frac{1}{4}$ ft. in depth at the centre. Inside the low gravel wall which marked the circumference of the pit ran a ledge about a foot wide, narrowing southwards until at the point where the southern face of the pit had been destroyed it almost merged in the outer gravel wall. This ledge, when followed downwards, proved to be the upper edge of a lining consisting of an outer layer of mixed earth and clay, followed by an inner layer of clay, burnt black and red on its inner face. On the inner edge of this ledge, on the east side of the pit, was a line of stones placed at depths varying from 10 to 12 in. at the north and south ends, while those between gradually descended in depth, the lowest being 21 in. below the modern surface of the ground. Since the lowest stones lay

¹ Possibly a cheek-piece for a bridle-bit, like those found in the Late Celtic village at Glastonbury (A. Bulleid and H. St. George Gray, *The Glastonbury Lake Village*, ii. 440 seq.).



Fig. 1. Bronze Age vase from Sutton Courtenay ($\frac{1}{2}$)



Fig. 2. Bone and flint implements, and stone celt (Bronze Age) from Sutton Courtenay ($\frac{1}{2}$)

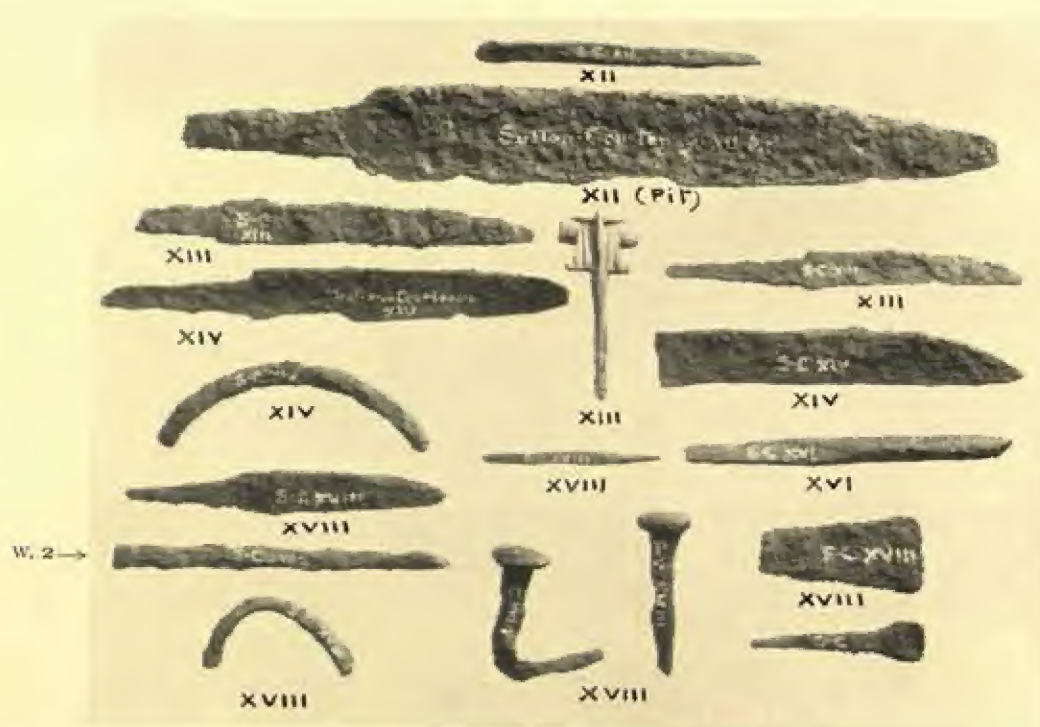


Fig. 1. Iron and bronze objects from Sutton Courtenay ($\frac{1}{2}$)



Fig. 2. Saxon vases and loom-weight, Sutton Courtenay ($\frac{1}{2}$)

somewhat inside the line of the ledge, they had possibly slipped out of position from the edge on which they had originally been placed. This seems likely from the presence of other blocks at a depth of 7 to 8 in. on the north and south rim of the ledge. Within this ledge the pit was found to be filled to the depth of the lowest stone with a filling of earth. Below that point, right down to the bottom lining, the pit was filled with bright red burnt material. Above this burnt layer were found, in addition to a few sherds of Saxon pottery, one sherd of Samian ware, which lay outside the ring of stones on the east side, and on the ledge on the same side a large iron tanged knife of the 'seax' type, measuring in all 10 in. in length, with its blade 7 in. long and just over 1 in. wide (pl. vi, fig. 1).

The somewhat constricted walls in the southern half of the pit and the almost V-shaped section revealed on the face of the gravel-pit on the south side suggest that there was an orifice of some kind to the pit on this side.

Absolutely nothing was discovered in the red filling which might have thrown light on the purpose for which such a pit was constructed. Its Saxon date is, however, attested by the discovery of the knife and its proximity to house XII, to which it presumably belonged.

House XIII (fig. 4). Orientated north and south, this house-bottom presents peculiarities not previously encountered in the course of our excavations, since it shows manifest signs of having been divided up into compartments. At the north end was a chamber the long axis of which lay east and west, measuring $11\frac{1}{2}$ ft., the width of the ground-plan of the entire house at this point. At a point 3 ft. from the north-west corner a low spur of gravel projected $1\frac{1}{2}$ ft. into the room, and behind this spur a semicircular bowl-shaped depression had been excavated in the gravel behind the line of the north wall. This depression measured 3 ft. in diameter, and its lowest bottom lay 9 in. above the floor of the house itself, which averaged 2 ft. in depth below the cultivated surface.

The compartment may be regarded as having been subdivided into two

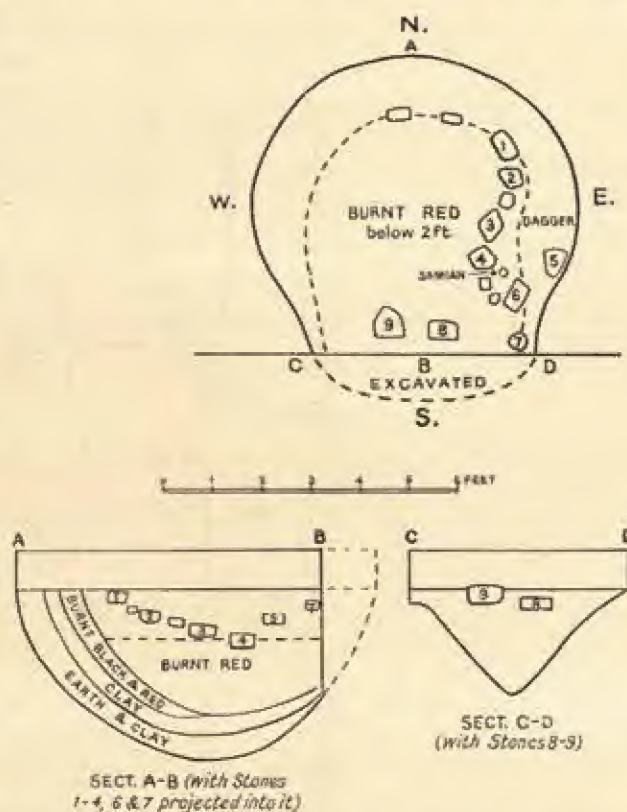


Fig. 3. Plan and sections of pit north of House XII.

portions, that at the western end being almost square, measuring $5\frac{1}{2}$ ft. from west to east and 6 ft. from north to south. The southern wall of this part of the room was formed in part by the northern edge of a sloping gravel-bank, $2\frac{1}{2}$ ft.

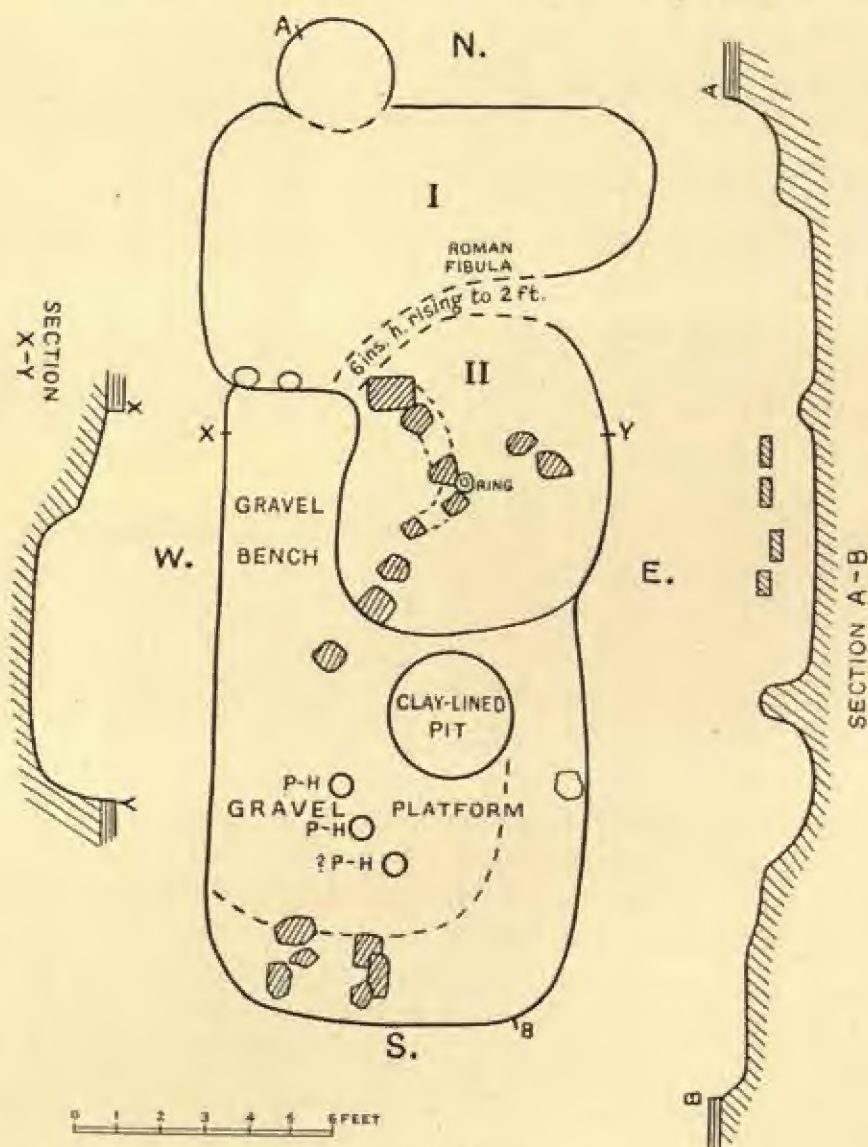


Fig. 4. Plan of House XIII.

in width, which, as will be seen, occupied a large section of the second compartment. At the inner corner of this bank a large stone, 15 in. long, had been placed 12 in. above the floor.

The second half of this first compartment measured 5 ft. from east to west, but was only 3 ft. 9 in. wide from north to south, the south side being bounded by a narrow spur of gravel which lay parallel to the north wall and, as seen,

sloped from the top of the gravel at its eastern end to some 6 in. above the floor in the middle of the house. It had the appearance, however, of having lost some of its height at its inner end. The inner end of this parallel spur was joined to the north-east corner of the bank on the west side of the house by a low ridge of gravel less pronounced than, but exactly comparable with, the threshold dividing the two conjoined rooms of house X.

This threshold gave access to a second compartment, which at the 2 ft. floor-level measured $8\frac{3}{4}$ ft. along its major axis north and south, and some $6\frac{3}{4}$ ft. in width. As usual in most of the houses, although roughly rectangular in plan, the compartment had rounded corners. The east wall lay a little within the line of the east wall in the first compartment, and the west side of the room was occupied by the gravel-bank already mentioned, which, starting from a height of 15 in. above the level of the floor, showed a rise of 9 in. across its width of $2\frac{1}{2}$ ft. to a line 15 in. inside the line of the west wall of the first compartment (see fig. 4, section x-y).

Several large stones in the southern half of the second compartment were probably the remains of the hearth. Immediately south of the centre of this deeper portion, and separated from it by a gravel wall 15 in. high, was a steep-sided, circular pit, $3\frac{1}{2}$ ft. in diameter, its bottom lined with clay. At the back of this pit the gravel-wall rose to its normal height.

Within these two compartments large quantities of broken animal bones came to light at all depths. Many of the sherds found belonged to a largish coarse vase with sloping shoulder and heavy rim. Four others belonged to an ovoid vase of well-burnished black pottery. It has a ring base and an out-turned rim, and in the middle of the wall is preserved one of two (or possibly of three or four) narrow perpendicular excrescences which have been perforated transversely for the purpose of suspension (see fig. 5, upper, showing the vase restored). Its dimensions are $4\frac{1}{4}$ in. in height and 5 in. at its greatest diameter.

In the first compartment were found two iron knives, the one $4\frac{1}{4}$ in. in length, the other of slenderer type and only $3\frac{3}{4}$ in. long (pl. vi, fig. 1). Several

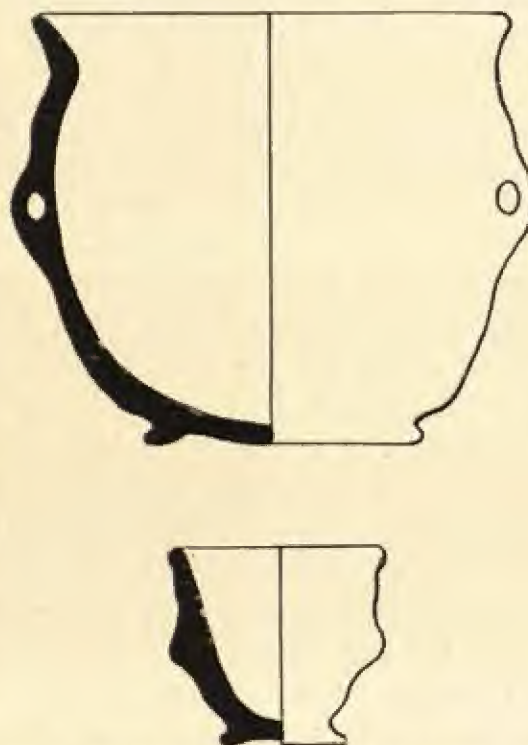


Fig. 5. Saxon vases from Sutton Courtenay. ($\frac{1}{2}$)

pieces of iron appear to have belonged to some flat object with upturned edges, formed by riveting together narrow iron plates, but not enough remains to determine its use. A bronze Roman fibula, 2 in. long, is of a somewhat uncommon type, usually dated about the middle of the second century A.D. (pl. vi, fig. 1).¹ Lastly, a metacarpal bone of a sheep, measuring $4\frac{1}{2}$ in. in length, exhibits along its shank a high polish from use as a spool or the like (pl. vii, fig. 2).²

The gravel bench on the west side of the house passed south of the second compartment into a platform which occupied the whole length and width of the remainder of the house, except for the small space excavated for the circular pit described above. This platform sloped down from the west side to the middle of the house, but, beginning from the east side of the circular pit, a secondary bench, 2 to $2\frac{1}{2}$ ft. wide, ran back to the south-east corner, and turning the corner was continued along the whole length of the south wall. On this bench, in the south-east corner, some seven or eight stones, some of them split or reddened by fire, arranged in two short walls abutting against the south wall and with a narrow opening between them towards the interior of the house, were evidently remains of a second hearth.

Between this hearth and the circular pit two small circular holes had been sunk into the gravel platform for a depth of about a foot, and $1\frac{1}{2}$ ft. apart. These were the only signs of anything in the nature of post-holes found throughout the house. The width of the house at its southern end was $8\frac{1}{2}$ ft., and the length of the platform from the southern end of the second compartment was also $8\frac{1}{2}$ ft., making the total length of the house from north to south 21 ft. In the southern section the finds consisted of a few sherds of pottery, some iron scoriae, and broken bones.

House XIV (fig. 6). This house, like the last, was orientated north and south. It measured 16 ft. 3 in. in length, and its greatest breadth was about $11\frac{3}{4}$ ft. It can only be described as rectangular in the widest sense of the term, since the corners were all rounded off, the north-east corner in particular approximating to the outline of a house of oval ground-plan.

In the south-west corner a small recess, the entrance to which from the house was flanked by a large piece of burnt limestone close to the west wall, and by a small projection of the southern main wall on its inner side, was found to be filled with red earth like the similar recess in house XII, and like that doubtless formed the entrance to the house.

¹ Cf. Oxfordshire Archaeological Society, *Report* for 1917, p. 94 and fig. 7, from Woodeaton, Oxon.

² For a similar use of such bones see A. Bulleid and H. St. George Gray, *op. cit.*, ii. 421 seq. A metatarsal bone from house VI (pl. vii, fig. 2), with a perforation near one end, may also be compared with specimens from Glastonbury.

The post-holes were situated at each end of the main axis of the house. Near the southern post-hole and opposite the recess, pieces of limestone and a Lias nodule lay about 6 in. above the floor, and other stones were found in other parts of the house. A little west of the median line a shallow trench, some 6 in. wide, was such as would have been formed by drippings in wet weather through a faulty junction of the roofing material at the summit of the ridge of the roof. The depth of the floor from the surface averaged about 2 ft.

The finds, apart from a large quantity of sherds, comprised an iron knife, 5 in. long, the blade of another nearly 4 in. in length, and a portion of an iron ring originally some $4\frac{1}{2}$ in. in diameter (pl. vi, fig. 1), two flint scrapers, one of black, the other of blue-patinated flint, flint-flakes, and a flint nodule, 2 in. in diameter, which exhibited signs of use as a hammer-stone. From the sherds it has been possible to build up a large portion of a huge globose vase of similar shape and dimensions to that found in house VII. From others has been reconstructed the straight-walled pot, $3\frac{1}{2}$ in. high and about $4\frac{1}{2}$ in. in diameter, illustrated in pl. vi, fig. 2, also the base of a similar vase. One small sherd was decorated with asterisk-filled circlets, and others with a zigzag pattern between horizontal lines lightly incised with a blunt-pointed tool. Among half a dozen sherds of Roman wares were the bases of two vases of grey wares, one of purplish-pink ware, and the carinated collar, about $1\frac{3}{4}$ in. in diameter (pl. vii, fig. 2), of a slender-necked vase of similar fabric, which has been deliberately smoothed down above and below for use as a spindle-whorl. Part of a hone of fine grey micaceous sandstone and a fragment of a pot-ring were also found in this house.

Part of a hone of fine grey micaceous sandstone and a fragment of a pot-ring were also found in this house.

House XV (pl. vii, fig. 1). Remains of a pavement of large unhewn blocks of limestone, 7 ft. long and 3 ft. wide, orientated NNW. by SSE., were found overlying a section of the south-east quadrant of the large circular Bronze Age

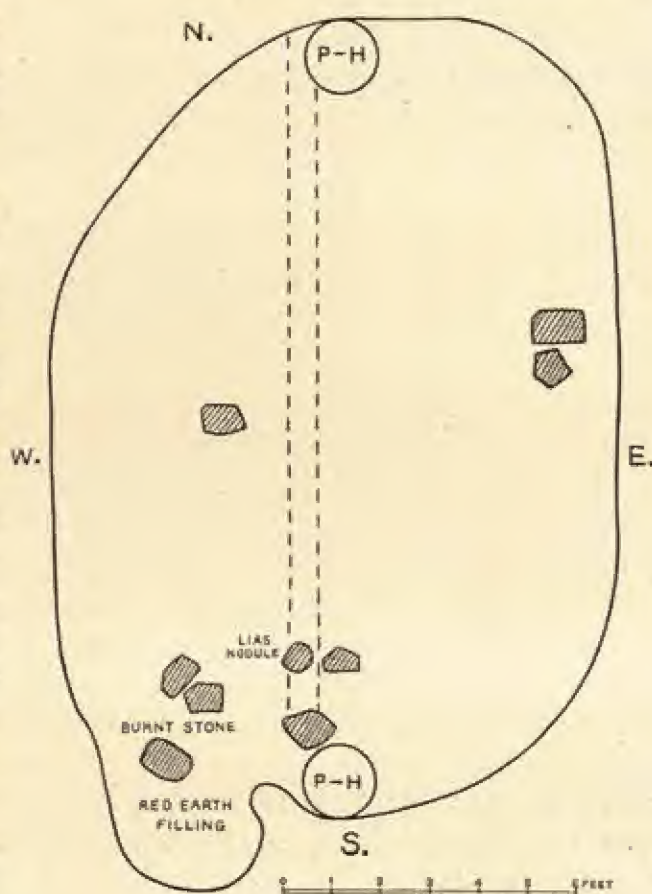


Fig. 6. Plan of House XIV.

ditch (see plan, fig. 1). It evidently formed part of the floor of a Saxon house. The builders, having failed to reach gravel at the desired depth of between $1\frac{1}{2}$ and $2\frac{1}{2}$ ft., laid this heavy paving as the only means of obtaining a reasonably dry floor. The nature of the surrounding soil, indistinguishable from that over the pavement itself, made it impossible to determine the limits of the house. One or two Saxon sherds were found above the pavement.

House XVI (fig. 7). In June 1924 this house, orientated east and west, was revealed in the process of gravel-digging towards the eastern end of the

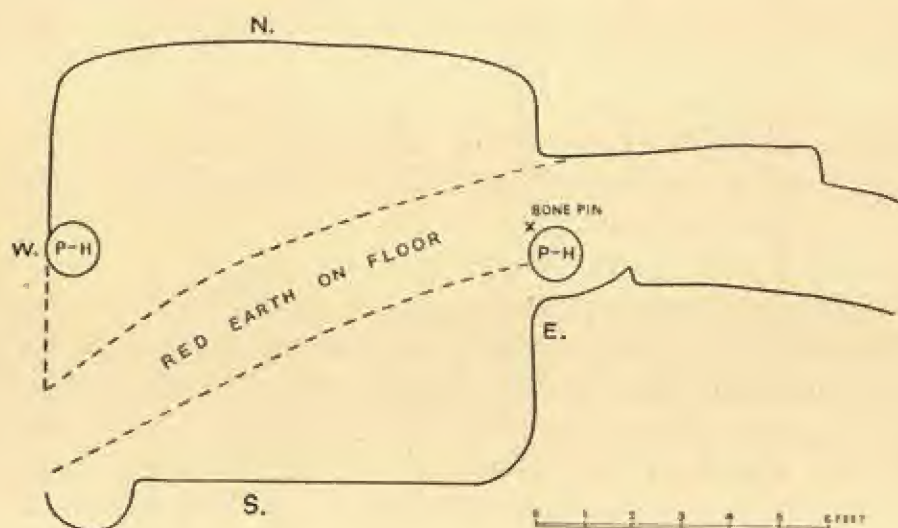


Fig. 7. Plan of House XVI.

site. It lay a little north-west of house IX, and seems to have belonged to the line of houses XII, XIII, and XIV. It was fairly rectangular in form, measuring 10 ft. in length, and in width some $9\frac{1}{2}$ ft. at its western end, decreasing to $7\frac{1}{2}$ ft. at the eastern end. The depth of the floor below the field-surface averaged $1\frac{3}{4}$ ft. At the south-west corner a circular hole projected some 2 ft. beyond the line of the south wall. This hole, the bottom of which was 2 ft. below the field-level, probably marks the entrance to the house as in house XII.

The finds were not numerous, and included a small quantity of sherds, all plain wares except one fragment of a small, low, carinated vase, decorated with shallow incised curved lines festooned below the carination. Besides these there were an iron awl or punch, $3\frac{3}{8}$ in. long, with the end blunted by use (pl. vi, fig. 1), and a very slender double-pointed bone pin, $5\frac{1}{2}$ in. long, a portion of another (pl. vii, fig. 2), two fragments of bones, a large boar's tusk, and the usual broken animal bones.

At the west and east ends were the usual post-holes. The condition of that at the western end suggested that the post which it had once contained had been levered out, thus enlarging the rim of the hole at one side. The depth of the holes was about $1\frac{1}{2}$ ft.

At the east end of the house the gravel wall was found to be incomplete, only $1\frac{1}{2}$ ft. remaining on the north side, and 3 ft. towards the south. Continuing our excavations beyond the gap thus left in the middle of the wall, we found that, from a point 12 ft. from the western end of the house, a trench varying from $2\frac{1}{2}$ ft. to 3 ft. in width ran on in an easterly direction for a further 4 ft. with a depth of 15 in. From that point the walls of the trench on both sides turned sharply southwards, and, maintaining an average width of 40 in., swung round in a curve towards the south-east. It had been noticed throughout, in excavating this trench, that the bottom was filled with the reddish soil which has been constantly remarked upon in the account of this site as being a regular feature of the pits and trenches which we have associated with the Bronze Age settlement. Further investigation proved that the trench to the east of this house was, in fact, nothing more than a portion of a shallow circular trench, presumably of Bronze Age date, though we found nothing in the way of sherds or the like to confirm this diagnosis absolutely. The Saxons, in excavating the ground for their house, had cut into the north-western quadrant of the circular trench, which left the house at the middle of the eastern wall on the one hand, and on the other at the south-western corner by the excrescent pit which served as an entrance to the house. The original line of the trench could be clearly traced across the floor of the house by a narrow band of red earth clinging to the gravel floor.

House XVII (fig. 8). An almost rectangular house, orientated east to west, measuring 11 ft. by $8\frac{3}{4}$ ft., with rounded corners, and $1\frac{1}{2}$ ft. deep. The post-holes, a little south of the middle of the short walls, were 2 ft. deep, and had been half recessed into the gravel wall. Three feet from the eastern hole lay a large flat stone with a smaller one burnt red near it; another large stone was found towards the other end of the floor.

As coming from the east end of this house, the workmen handed to me a piece of a small Saxon vase and a bowl, practically complete, though very worn and chipped, of pseudo-Samian ware, with a scroll decoration in white on the rim (pl. VIII, fig. 1). Otherwise the floor of the house produced nothing beyond animal bones, but in the bottom of the post-holes an interesting discovery was made. From the eastern hole, partly destroyed before we excavated it, were recovered most of the bones of two hind feet of a dog, and from the western hole some of the bones of the two front feet.

House XVIII (fig. 9). Here, as in house XV, the Saxons encountered the

large Bronze Age circular ditch, but evidently in this case determined to find the gravel. Consequently they had to excavate to a depth of 4 to $4\frac{1}{2}$ ft. before they reached the base of the Bronze Age work. Such a depth below ground-level is evidently not normal for the Saxon cottage. At the same time it seems to indicate that in the shallower houses the eaves of the roof did not descend to the ground, but that the side-walls were raised by a bank around the outside of the pit.

This house was orientated north and south, and measured $13\frac{1}{2}$ ft. by 11 ft.

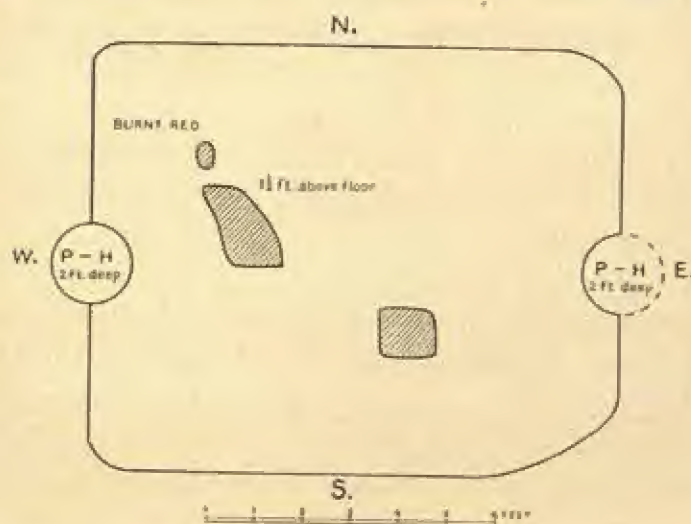


Fig. 8. Plan of House XVII.

Five feet from the north end were removed by the workmen; in the remaining portion, as shown on the plan, were found several largish stones at various depths, ranging from 6 in. to $2\frac{1}{2}$ ft. above the gravel-floor. No clear indication of their purpose could be detected, but presumably they belonged to a hearth. No post-hole was discovered at the south end.

The following objects were found. Of iron, a very fine awl, 2 in. long; a knife, $3\frac{1}{2}$ in. long; a chisel, $2\frac{3}{4}$ in. long; nails and part of a ring (pl. vi, fig. 1). Of bone, a whorl, $1\frac{1}{4}$ in. in diameter, and an oblong plaque measuring $2\frac{3}{4}$ in. by $\frac{3}{4}$ in. and $\frac{1}{8}$ in. thick (pl. vii, fig. 2). It has a large perforation at each end, and on one face is decorated with three engraved bull's-eye circlets within a line-border. Sherds were scarce, but one provides a new Saxon ceramic type (pl. vi, fig. 2 and fig. 10). Of truncated half-oval form, $4\frac{1}{2}$ in. high and about $6\frac{1}{4}$ in. in diameter at one end and $2\frac{1}{2}$ in. at the other, it is open at both ends and its walls were perforated all over with holes pierced from the outside and left rough on the inside. The sherds discovered, constituting about one-third of the whole object, show no signs of having been subjected to any intense heat. Indeed they are little, if at all,



Fig. 1. Pavement of House XV



Fig. 2. Objects of bone, antler, &c. (1)



Fig. 1. Saxon and Roman pottery, Sutton Courtenay ($\frac{1}{2}$)

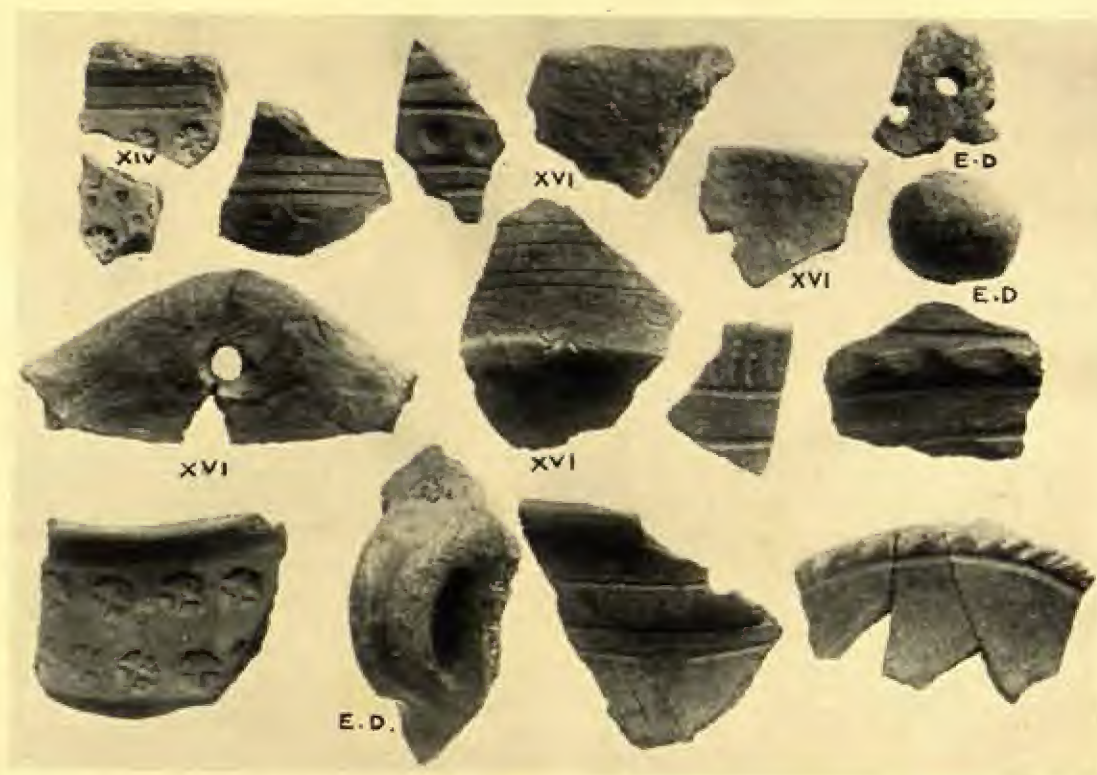


Fig. 2. Decorated and other Saxon sherds, Sutton Courtenay ($\frac{1}{2}$)

better baked than the average Saxon pot. On the analogy, however, of tubular perforated objects from Mesopotamia, it is probably some form of brazier intended to be filled with charcoal, and set with its wider mouth downwards on a platter or flat stone.

House XIX (fig. 11). In the last report of this village-site it was noticed that two pot-rings discovered in the cutting on the Sutton Courtenay road were among the first relics obtained from the site. Further evidence of houses at this point came to light in 1923, in the remains of a house measuring $10\frac{1}{2}$ ft. by 8 ft. at its widest points. The plan, as the figure shows, was very irregular, and, in contradistinction to all the other houses uncovered, had its roof-tree along its shorter dimension.¹ The western post-hole was placed some 4 ft. from the southern wall: the eastern hole had disappeared in gravel-digging before we became aware of the existence of the house. North of the western hole was a short gentle ramp in the gravel, whether leading to an entrance at the side of the post it was impossible to determine. Nothing but a few sherds and some broken bones was found.

House XX (fig. 12). Situated 110 yards south of the Drayton-Sutton Courtenay road and 30 ft. from the eastern boundary of the gravel-pit. It was orientated north-west to south-east and must have measured some 12 ft. in length and about 6 ft. in width, but, as its south side and the west end had been removed by the workmen, its

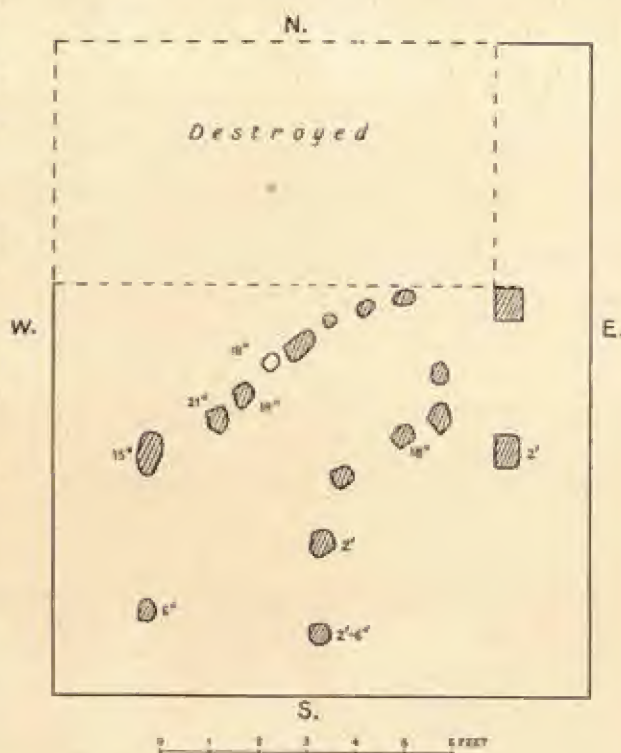


Fig. 9. Plan of House XVIII.

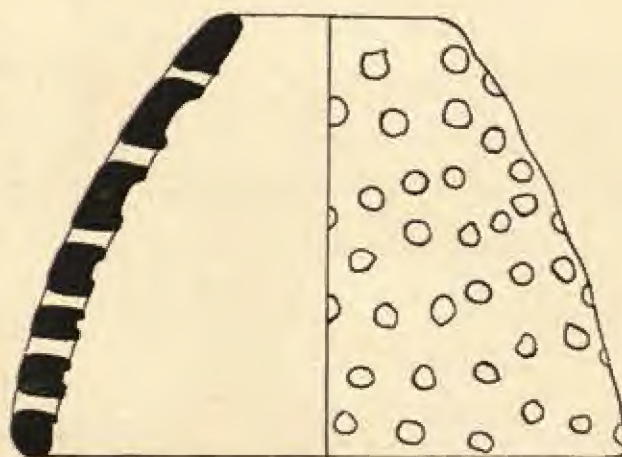


Fig. 10. Perforated pottery utensil, (b)

¹ It might be argued from the plan that the length east to west was, in the absence of discovery of the eastern post-hole, much longer than 8 ft., but the close watch kept on the site enabled us to gauge to a few inches the amount removed behind the older working-face at any given point.

dimensions are largely based on such information as we could obtain from them. The gravel floor lay 3 ft. below the surface of the field, but only penetrated the gravel for 15 in., there being a greater thickness of top-soil here than, for instance, above houses I to IX.

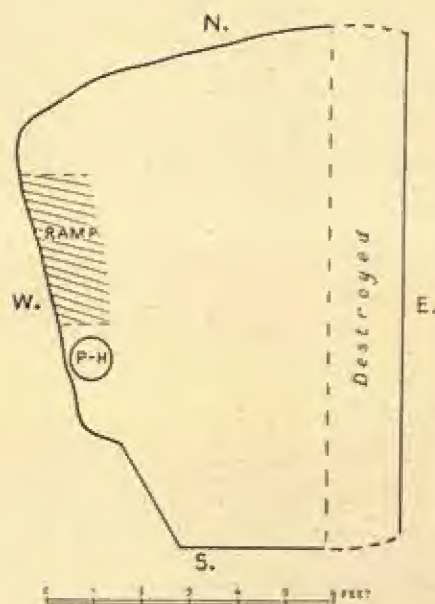


Fig. 11. Plan of House XIX.

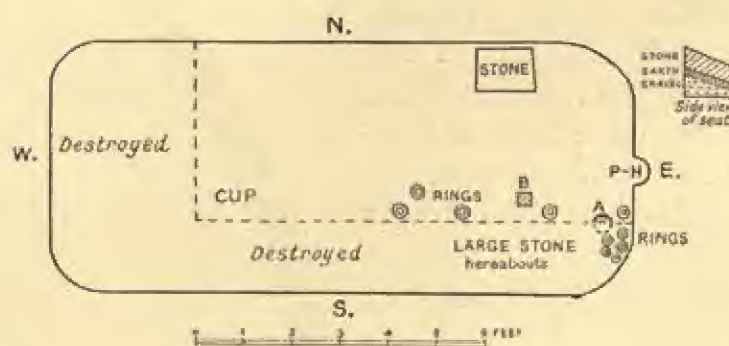


Fig. 12. Plan of House XX.

At the east end, 3 ft. from the north wall, a curved recess in the gravel-face probably indicated the position of the roof-post. Close up against the north wall and 2 ft. from the east end a large flat block of limestone, 13 in. long, 11 in. wide, and 4 in. thick, had been set on a sloping bench of gravel so as to form a tilted seat, 13 in. high at the back and 8 in. in front. Its purpose was suggested by further discoveries.

From the part removed by the workmen, in addition to a few sherds, one of them decorated, the workmen recovered a fine bone spindle-whorl, biconical in shape, 2 in. in diameter and 1 in. thick, and decorated on both faces with finely engraved concentric circles; a flat perforated disc of lead, $1\frac{1}{8}$ in. in diameter, the base of a pseudo-Samian bowl with the rough edge trimmed, and no less than five complete and fragments of three other clay rings, as from house W. 2 (pl. VI, fig. 2). The five perfect specimens were found against the east wall and close to the southern edge of the portion of the floor excavated by us. They evidently had lain in a bunch, since the finder described them as having 'come out on one fork'. From the remainder of the floor we collected a fair quantity of sherds, one decorated, and others forming two large fragments of a well-burnished black vase about 8-9 in. high, apparently of the same form as one from house VII (see fig. 7 in the first report); a miniature black cup of truncated conical shape, 1 in. high and $1\frac{1}{8}$ in. in diameter; lastly, five more complete clay rings and half of another, thus vouching for at least 14 of these rings in the house. Four of the complete specimens lay at intervals over a distance of 5-6 ft. along the south edge of the undestroyed floor, the fifth a little farther north towards the middle of the floor.

The purpose of these rings, which has hitherto been only conjectural, now becomes perfectly evident. They are loom-weights. We are in the presence of an upright loom, the warp-threads of which were suspended either from the roof-tree itself or from a framework, the position of one upright of which is possibly indicated by a hole 9 in. deep near the east wall (fig. 12, A). The weaver must have sat either on a large stone found by the workmen in this part of the house near the south wall, or on the seat against the north wall. A slight depression (fig. 12, B) evidently indicates where the weaver rested her right heel in the one case, her left in the other, to support herself in leaning forwards to her work. It looks as if a warp, 4 to 5 ft. wide, had been hanging in position when the house was abandoned, and that as the threads rotted the rings (or some of them) fell to the floor where we found them. The bunch found by the workmen may have been spares. Two metatarsals of sheep served as bobbins, as in the Somerset lake-villages.¹

In the houses orientated east and west the entrance, where it has been capable of determination, has been found at the west end of the south wall. If this was the case here, the loom stood in the innermost part of the house. A parallel is afforded by house W. 2, *infra*, where also several rings were found on the south-eastern portion of the floor. In view of the length of the two

¹ *Supra*, p. 68.

houses there must have been windows or shutters in the east wall, in order to provide the weaver with sufficient light.

Further indication of the width of the loom comes also from house W. 2. There a post, possibly the main-post of the house, stood $1\frac{3}{4}$ ft. from the east wall and another post, which, judging from the diameter of the hole, must have been $\frac{1}{2}$ to $\frac{3}{4}$ ft. thick, stood $6\frac{1}{4}$ ft. from the same wall, giving an interval of $4\frac{1}{2}$ ft. This post also, standing on the middle line of the house, would be fastened above to the roof-tree. It is to be noted that part of a ring actually lay between these two post-holes. The holes on the south bench of house XIII may also indicate the position of a loom. Some idea also of the height of the house is suggested by the need of some 4 to 5 ft. against the side-walls to give the weaver adequate head-room. This would entail a roof-tree at least 7 or 8 ft. above the level of the floor.

House W. 1. In the previous account mention was made of the traces of Saxon occupation on the west side of the Milton road, where other gravel-pits are being excavated. On the southern boundary of Sutton Courtenay parish, in the angle formed by the Milton road and an accommodation track known as Drayton East Way, is a small field now almost entirely excavated. Here we were able to observe the existence of a house-bottom orientated east and west and measuring along that axis some 10 ft. We were unable to clear it out ourselves, but the workmen at the pit brought us several sherds, a slender double-ended bone pin, 3 in. long, and a small bronze coin of Gratian (A.D. 375-83), of Lugdunum mint (pl. VII, fig. 2).¹ This last was found on the floor of the house close to its western end.

House W. 2 (fig. 13). In another plot of land immediately north of this field we were able, by kind permission of Mr. Winter, the owner of the pit, to investigate another outlying house, situated some 70 yards west of the Milton road, orientated also east and west. Considerable portions of this house had been destroyed at an earlier date when portions of the plot had been excavated and the gravel screened for the removal of the large gravel, the sandy material being subsequently replaced. Fortunately the greater part of the house remained untouched, the larger quantity of earth encountered when the north and south sides of the house were reached having caused operations to be stopped.

The house was evidently of well-planned rectangular form, measuring 12 ft. in length by some 9 ft. wide, and 18 in. deep. Three large stones were

¹ Cohen viii, 130, type 36. *Obv.* D.N. GRATIAN — VS AVGG AVG. Bust diademed and draped to r. *Rev.* SECVRITAS — REIPVBLICAE. Victory marching to l., holding a wreath and a palm: in field OF — I: in exergue LVC PD.

found lying along a line parallel to and 2 ft. from the south wall. The post-holes were three in number, one 18 in. deep, at $1\frac{3}{4}$ ft. from the east wall; a second 12 in. deep, at the middle of the floor; and the third 21 in. deep, set in a recess outside the line of the west wall. A flat stone and a piece of white clay or burnt limestone lay immediately east of the centre hole. Sherds in no great quantity included one decorated fragment, a portion of a colander; two Roman sherds; broken bones were found as usual, also an iron awl, $3\frac{1}{2}$ in. long (pl. vi, fig. 1); but this house was particularly remarkable for its clay-rings, namely,

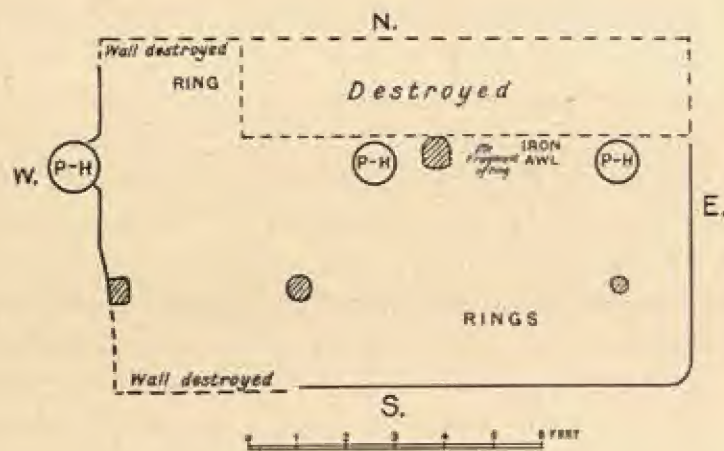


Fig. 13. Plan of House W. 2.

one complete specimen and large fragments of no less than six or seven others. The complete ring, built up from scattered fragments, measures 6 in. in diameter (pl. vi, fig. 2).

The only other objects found were a single-pointed bone pin, $4\frac{3}{4}$ in. long, and, unlike those previously discovered, unperforated at the butt end (pl. vii, fig. 2), and a small narrow strip of bronze with one end bent back in a right angle, possibly a portion of a pair of tweezers, such as are found in Saxon graves.

Apart from the finds already recorded the following objects may also be noted:

Bone (pl. vii, fig. 2, A-C). Casual finds recovered by the workmen include part of a bone pin, an imperfect, triangular-backed comb, about $4\frac{1}{2}$ in. long, decorated with engraved bull's-eye circlets within a quintuple line border and with a pierced edging, and the end of another of double-toothed, oblong form, in which a heart-shaped notch has been cut in the end.

A note may here be added about the purpose of the double-pointed pins or rods. They are of such varying lengths that it is hard to believe that they served a uniform purpose, but rods of an exactly similar type are still used as shed-rods, heddle-rods, or laze-rods on narrow belt-looms among various

peoples. A good illustration of such rods in use is to be seen in a picture of a belt-loom of the type mentioned as worked by the Indians of New Mexico.¹

Pottery (pl. vi, fig. 2 and pl. viii).² A reconstruction of the small carinated vase with stamped ornament found in room 3 of house X (see first report). The sherd, which had been burnt to a light colour, has been inserted in place in the upper part of the vase. In the East Ditch was found in 1923 a small globose pot. It has thick walls and is of heavy and clumsy make, though the exterior surface has been carefully smoothed; it measures $3\frac{1}{2}$ in. in height and about $3\frac{1}{2}$ in. in diameter.

From a sherd found in house XVI a new vase-form (see also fig. 5 lower) has been restored in a tiny goblet 2 in. high and $2\frac{1}{4}$ in. in diameter. It had originally two, or possibly three, small bosses on its sides and a flat splayed foot. Sherds of similar small cups were found in the earlier excavations. The miniature cup or crucible(?) $1\frac{1}{2}$ in. high and 2 in. in diameter, is also thick-walled and of rough fabric. It was found in the upper layer of the ditch of circle B. From the same layer, just north of house XVIII, came a well-made pedestal-foot which can be paralleled from Frilford. Another casual find is the base of a small-footed Roman vase, $1\frac{1}{2}$ in. high and 2 in. in diameter, which has been roughly levelled round the top edge and has been used as a lamp. On the edge and walls traces of burning can be observed (pl. viii, fig. 1). From the East Ditch came also a fragment of a colander or brazier and the half of a globular pottery whorl, $1\frac{1}{2}$ in. in diameter.

The imperfect vase with perforated lugs from house XIII can be paralleled by an almost identical vase with similar lugs, found at Rijnsburg, near Leiden, Holland, in the Leiden Museum.³ Handles of any kind are an uncommon feature on Saxon pottery in this country. Indeed, Professor Baldwin Brown cannot record a single instance of such a handle, at any rate on urns of what he describes as the Anglian type.⁴ A specimen of a vertical handle found in the East Ditch is, therefore, noteworthy. Even more curious are large

¹ M. L. Kissell, *Yarn and Cloth-making*, fig. 46.

² E.D. in these figures indicates East Ditch.

³ *Oudheidkundige Mededeelingen uit 's Rijksmuseum van Oudheden te Leiden*, Nieuwe Reeks, v, 1 (1924) (= *Intern. Arch. für Ethn.*, xxvii), p. 19, pl. iii, 8 (no. 2 in the top row).

⁴ *The Arts in Early England*, iv, 501. It is, as suggested by the numerous decorated sherds found in the course of these excavations, extremely doubtful whether Professor Baldwin Brown's association of the ornamented urns with cremation is entirely justified. The two things do not necessarily go hand in hand. Even the crude aesthetic sense displayed on Anglo-Saxon pottery is intended for the enjoyment of the living as much as for the honour of the dead.

Handles are of frequent occurrence on the Continent, as noted by Baldwin Brown, e.g. at Hoogebeintum, Friesland (P. C. J. A. Boeles, *De Friesche Terpen*, figs. 2 and 7); at Rijnsburg (J. H. Holwerda, *Nederland's Vroegste Beschaving*, pl. vi, 3, 5, and 9); at Gudendorf, Westerwanna, and

horizontal handles, one complete and two fragments of others, from house XV, which are evidently nothing less than ceramic imitations of the triangular ears on bronze bowls, like that described and figured in Baldwin Brown, *op. cit.*, iv, 472, pl. cxvii, 3.¹

Apart from the decorated sherds already mentioned, most of which are here figured, others have come to light. A selection of these, also illustrated, gives a good idea of the variety of Saxon ceramic ornament. Roman sherds have again been found, but only in such quantity as suggests collection from some Roman site in the neighbourhood. They form only an insignificant minority among the mass of sherds which the site has produced. Of common occurrence are the bases of vases, in some instances trimmed round the edge to serve as pot-lids or in the smaller examples possibly as gaming-pieces. Among recent finds is a portion of one of the very thick rims known from late Roman sites such as Scarborough. In house XVI were found several sherds of a largish hand-made vase of a hard gritty ware, thin, hard, burnt red to black outside and light grey inside, and with lightly incised linear ornament. It is possibly even of pre-Roman date.

DISCUSSION

MR. REGINALD SMITH remarked that two points might have been discussed had time permitted: the variety in plan of the Anglo-Saxon houses shown on the screen (possibly selected from a larger number for that reason), and the variety in date of the objects recovered from the site, some dating at least as far back as the Bronze Age. Successive occupations of the site would be an easy explanation. The perforated bowl of pottery reminded him of a Roman specimen recently added to the British Museum. It was found in Northants with a stout pottery disc having concentric ribs and perforations, usually called a cheese-press; and he believed

Altenwalde, Hanover (A. Plettke, *Ursprung und Ausbreitung der Angeln und Sachsen* (C. Schuchhardt, *Die Urnenfriedhöfe in Niedersachsen*, Bd. III, Heft 1), pl. 29, 8; 38, 9; 40, 8); the last-named area, as proved by the equal-armed brooch found in house X, being that from which the invaders of the Upper Thames Valley came. This frequency abroad and their absence in this country also suggests that they belong to the earlier stages of the culture of the invaders. Holwerda includes those cited above from Rijnsburg among his 'Protosaksisch' pottery.

¹ This type of bowl is regarded by him as one of the earlier Anglo-Saxon forms.

that was the first instance of both parts being found together. He could think of no other explanation, though the bowl on exhibition had a large opening in the base, possibly not original.

Mr. LEEDS replied that though the bowl had undergone some restoration, the large hole in the base was certainly original and he could not accept the cheese-press theory.

The PRESIDENT expressed the indebtedness of the Society to Mr. Leeds for his arduous labours on the Sutton Courtenay site and for completing his report on the discoveries made there.

IV. *Flint Arrow-heads in Britain.* By REGINALD A. SMITH, Esq.,
Vice-President

Read 29th April 1926

By examining those arrow-heads which are known to have been found in strict association with typical objects and by ignoring those from the material of barrows or from the surface of ploughed fields, it should be possible to classify the series and to establish the successive changes in an article of common use during the later Stone and Bronze Ages of Britain. Only brief references to continental work on the subject will be necessary to enable comparisons to be made, to trace possible lines of communication, and to reach some measure of agreement as to chronology.

It is curious that Neolithic arrow-heads are confined to the closing phase of that period, though they were plentiful in the Upper Palaeolithic, and the smaller (willow-leaf) 'points' of early Solutré date might easily be mistaken for British neolithic specimens. The tanged pattern with rudimentary barbs is even earlier, being characteristic of the Font-Robert phase (latest Aurignac), and the common use of the bow seems proved by Late Palaeolithic representations of hunted animals, not to insist on the 'archer' bas-relief of Laussel, Dordogne. Perhaps Early Neolithic man, like his predecessor of La Madeleine, neglected flint in favour of bone and antler points for his missile weapons.

In 1865 Thurnam opened a long-barrow on Fyfield Hill near Pewsey, Wilts., known as the Giant's Grave, and measuring 315 ft. in length, 70 ft. in width at the east and 50 ft. at the west end, and 7 ft. high at the east end, near which, on the natural level, three or four skeletons were found, the only well-preserved skull having an index of 69. The only object found with them was an arrow-head (fig. 1) weighing 43 grains, the point missing, as is often the case.

The subject was fully discussed by him in *Proceedings*, 2nd ser., iii, 168 (1865), where the specimen from Walker (Walcway) Hill, North Wilts. (fig. 2) is stated to have been found among the debris of the ruined chamber near the east end of a very large long-barrow; as frequently happened, the ends were broken off before burial, this method of dedicating the weapon to the dead having also been noticed in Yorkshire (Mortimer, *Forty Years' Researches*, pp. 59, 162). In 1863 he witnessed the opening of the Rodmarton long-barrow in Gloucestershire, which contained twelve or thirteen skeletons with two

delicate arrow-heads (fig. 3), again purposely broken at the point (*Proceedings*, 2nd ser., ii, 275).

From a sketch by Ll. Jewitt, Thurnam was able to identify a leaf-shaped arrow-head from a long-barrow near Heslerton-on-the-Wold, in the East Riding (*Proceedings*, 2nd ser., iii, 169), recorded by Bateman (*Ten Years' Diggings*, p. 230). Near the centre was a pile of about fifteen skeletons, and inside one of the skulls 'a small and neat flint arrow-head', $1\frac{1}{8}$ in. by $\frac{4}{8}$ in., which was rather broader in proportion than those from the long-barrows of Wilts. and Gloucs., from which it also differed in retaining both its points. Bateman does not give the shape



Fig. 1. Arrow-head from long-barrow, Fyfield Hill, Wilts. (†)



Fig. 2. Arrow-head from long-barrow, Walker Hill, Wilts. (†)



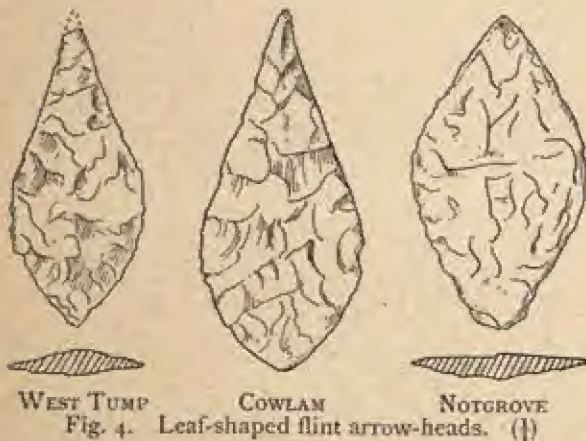
Fig. 3. Arrow-heads from long-barrow, Rodmarton, Gloucs. (†)

of the barrow, which 'measured 57 yds. round the base and 6 ft. high', but adds that six of the skulls were well enough preserved to be classed as dolichocephalic, or rather kumbe-kephalic (Wilson).

Specimens from two famous chambered long-barrows have been recently published by our Fellow Mr. O. G. S. Crawford, and are quoted here as being true to type (fig. 4). The more slender point, 1.6 in. long, comes from the south chamber of West Tump, near Birdlip, Gloucs., excavated by the late Mr. G. B. Wits, who gave the best account in his *Archaeological Handbook* of the county, p. 8. The other is a regular lozenge of the same length from Notgrove, where it was associated with a large bead of shale, $1\frac{1}{2}$ in. long, of flat oval form, and a scrap of pottery with bevelled lip. Both arrow-heads are now in Cheltenham Museum.

The Scottish evidence as to the leaf-shaped and lozenge arrow-heads is neither copious nor consistent, but must be recorded for what it is worth. A good example of the birch-leaf pattern (fig. 5) was found in one of the Slidery

cists of Arran, close to a round-bottomed bowl of neolithic type (*Proc. Soc. Ant. Scot.*, xxxvi, 94); and although there was charcoal on the floor, the bones and stones in it showed no traces of fire. The cist referred to was on the average 5½ ft. long and 3 ft. broad inside, quite capable of accommodating a skeleton. Four good specimens (fig. 6) all came from one chamber of the Arran cairns (*op. cit.*,



xxxvii, 49), but there was nothing found in association. Horned cairns are generally classed as neolithic, and a birch-leaf example (fig. 7) came from a chamber of the Get, Garrywhin, or Ormiegill cairn, Caithness (*op. cit.*, vii, 500; ix, 246; Anderson, *Scotland in Pagan Times*, 246). It was found in compacted ashes on the floor, but not necessarily with a cremated body, though two out of three (fig. 7) found in a calcined condition in Unstan cairn, Orkney, were of the lozenge pattern found with skeletons in the south (*Proc. Soc. Ant. Scot.*, xix, 350).

The chronology is complicated by Dr. Anderson's discovery of burnt burials *in* the floor, and unburnt *on* the floor, of chambered cairns in Caithness (*op. cit.*, xix, 344). In connexion with the Unstan cairn on the Loch of Stenness, Orkney, it is stated that 'fragments of bones were found in the floor of this compartment, but none which showed any trace of burning. Curiously enough,

however, the flints present indubitable indications of fire. Upon the black stratum there were laid several burials in the contracted posture as in the Caithness cairns' (*ibid.*, p. 344).

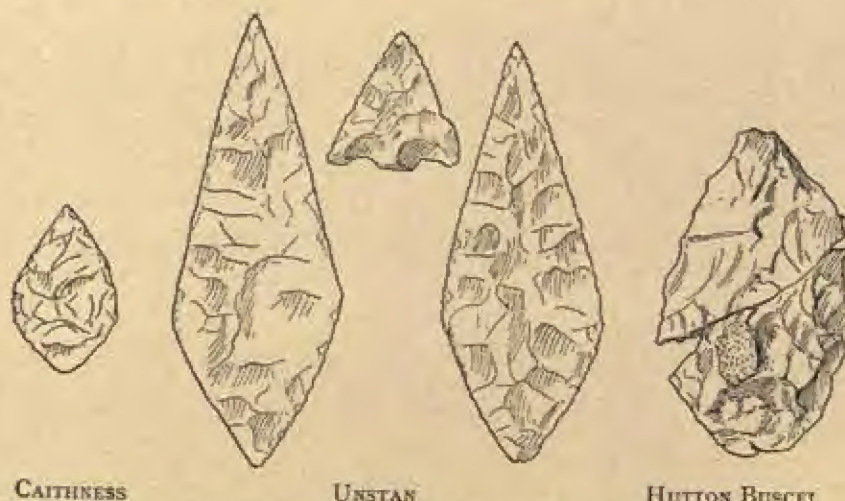


Fig. 7. Flint arrow-heads from Scotland and Yorkshire. (1)

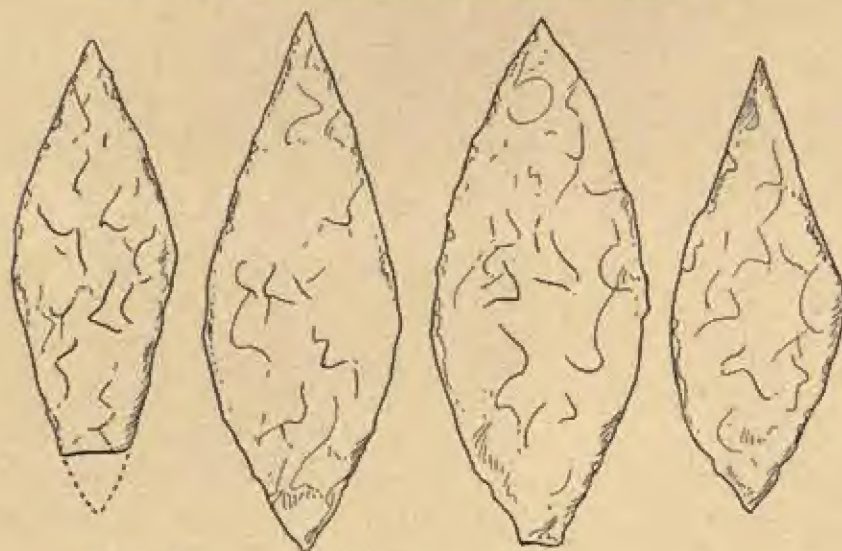


Fig. 8. Flint arrow-heads from barrow, Pistle Down, Dorset. (1)

On the available evidence Thurnam based a classification which has been fully borne out in recent years; and his remarks in *Proceedings*, 2nd ser., iii, 170, were incorporated in his paper on Long Barrows in *Archaeologia*, xlii, i, 194. He rightly insisted on the repeated discovery of leaf-shaped arrow-heads in long-barrows, which never produced the more advanced and complex types with tang and barbs, 'which are not unfrequently found in the circular barrows of the Age of Bronze and of burning the dead' (p. 231). In his opinion, oval barrows were contemporary with the round type and were the work of the

same people, two or more round barrows being set close enough together to form a single mound; but he nevertheless records the discovery of four leaf-shaped arrow-heads (fig. 8) in an oblong barrow on Pistle Down, Dorset, which was opened by Dr. Wake Smart in 1828 and described as of no great height, having nothing in common with the true long-barrow, and only deviating from the ordinary type (which he considered Roman) by presenting an oval or somewhat oblong shape. The specimens were illustrated among the Errata of Charles



Fig. 9. Arrow-heads from barrow, Winterbourn Stoke Down, Wilts. (1)

Warne's *Celtic Tumuli of Dorset*, and Thurnam points out the resemblance to the Winterbourn Stoke barrow, where the arrow-heads were larger than the type he associated with long-barrows. Four fine lance- or arrow-heads of flint were found close to the skull of a tall man buried in a flexed position with head west within an oval barrow on Winterbourn Stoke Down, near Stonehenge, Wiltshire, in 1864. The three leaf-shaped specimens (fig. 9) range from $2\frac{3}{4}$ – $3\frac{1}{2}$ in. in length, the other being lozenge-shaped and $3\frac{1}{2}$ in. long; and the group is distinguished by Thurnam from the long-barrow type, properly so-called, which is also leaf-shaped, but small and delicate, found by himself in several instances.

The connexion between long-barrows and leaf-shaped arrow-heads was also traced by Thurnam in Derbyshire, and he quotes Long Lowe near Wetton, Staffs., where, in a cist containing thirteen skeletons, were discovered three very finely chipped flint arrow-heads of leaf-pattern. This was a twin barrow consisting of two circular mounds connected by a bank, altogether 220 yds. long

(plan in Jewitt's *Reliquary*, iv, 27); and the cist mentioned above was near the centre of the larger mound at the north-east end in 1849. In Derbyshire Bateman found two skeletons and two leaf-shaped arrow-heads in a previously disturbed cist within the curious barrow called Ringham Lowe, near Monyash (*Ten Years' Diggings*, pp. 94, 96); and another cist in the same barrow produced three more arrow-heads of the same type: all were white, and one was $2\frac{1}{4}$ in. long and 1 in. broad in the middle, the weight being under 48 grains (fig. 10). A similar set, broken and not too closely associated, was found by our late Fellow



Fig. 10. Flint arrow-heads from cists, Ringham Lowe, Derbyshire. (†)

Mr. John Ward in a barrow covering a stone chamber near Brassington, Derbyshire (*Derbyshire Arch. and Nat. Hist. Soc.*, xii (1890), pp. 119, 121).

A good instance of lozenge-shaped specimens in different sizes is recorded in *Proceedings*, 2nd ser., iii, 324. In 1866 Dr. Barnard Davis described Mr. Mortimer's discovery of five in a barrow, 60 ft. in diameter, near a farmhouse called Calais Wold, on Bishop Wilton Wold, four miles from Pocklington in the East Riding. Two cinerary urns were found respectively 1 ft. and 2 ft. below the summit, and at 3 ft. the flint points (fig. 11) were found together in a dark substance which ran out on either side in a bent streak and no doubt represented the long-bow. Dr. Davis's comment was as follows: 'Whatever may be based upon the finding of leaf-shaped flint arrow-heads in long barrows, and of leaf-shaped flint javelin-heads in oval barrows (alluding to Thurnam's dictum in *Archaeologia*, xlii, 231), it cannot be questioned that at times at least they both occur simultaneously in the same barrow, and that their presence does not concur either with a long or an oval barrow, but that they are found laid side by side in a conical barrow of the age of cremation.' The present series (*Archaeologia*, xliii, 415, fig. 103, a-d; *Reliquary*, vi (1865-6), 189; Mortimer,

p. 164, figs. 413-16) certainly came from a round barrow, but their connexion with a cremated burial is an assumption rather than a fact, though a leaf-shaped arrow-head (fig. 7), itself damaged by fire, has been found with a cremation in a round barrow on Wykeham Moor (Hutton Buscel) in the North Riding by Canon Greenwell (*British Barrows*, clix, p. 369).

This was clearly exceptional but not unique, as two leaf-shaped specimens (one damaged by fire) were found beneath the bones of two persons in a round barrow called Grub Lowe, between Grindon and Waterfall, Derbyshire (Bateman,

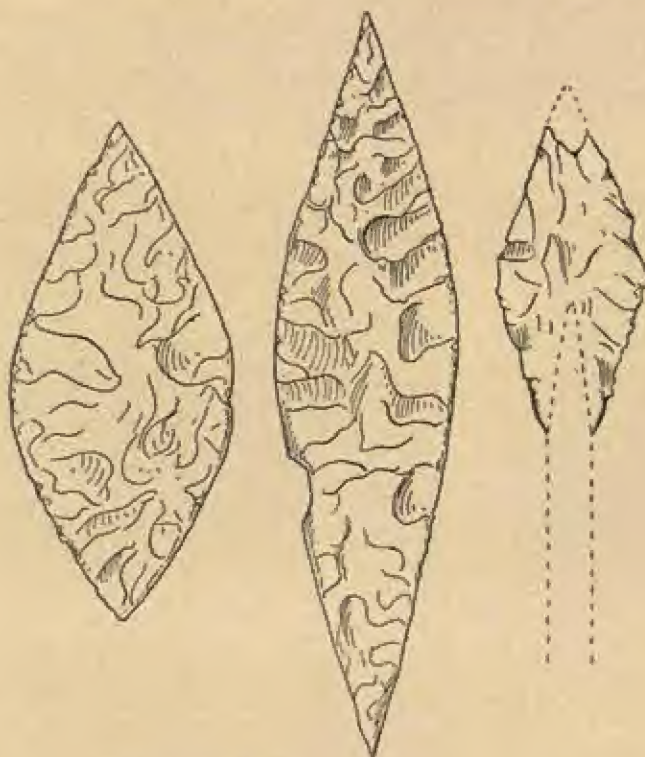


Fig. 11. Lozenge-shaped arrow-heads from Calais Wold barrow, E.R. Yorks. (f)

Ten Years' Diggings, p. 148). One body had been interred in the natural state, with the knees drawn up; the other had been reduced to ashes, which were distributed about the first, along with much charcoal. It is conceivable that both arrow-heads belonged to the unburnt burial, and that one was affected by the heat of the cremated remains on a subsequent re-opening of the barrow; but, whatever the explanation, the leaf-shaped type is here found in a round barrow.

With reference to the association of leaf-shaped arrow-heads with traces of fire, there should be mentioned a discovery by Canon Greenwell in a round-barrow near two long-barrows on the wold in Rudston parish, E.R. Yorks. (*British Barrows*, lxi, p. 229). 'At a distance of 16 ft. from the centre, and laid upon the natural surface, was a deposit of burnt earth, which extended over a space of several feet; amongst it were flint chippings, a leaf-shaped flint

arrow-point, and a quantity of dark-coloured plain pottery of the same description as that found in other barrows.' This refers to the plain round-bottomed bowls which can be attributed with more confidence to the Neolithic period since the type was discovered deep in the ditches of the enclosure on Windmill Hill near Avebury; but there is nothing in the above account to support the theory of a neolithic burial after cremation. The same type of pottery associated with similar burnt material was found by Canon Greenwell also in a trench



HUGGATE WOLD

ALDRO

Fig. 12. Flint arrow-heads from Yorkshire. (1)

beside a round-barrow in Heslerton parish, E.R. Yorks. (*B.B.* 143, fig. 91, on p. 107); and Mortimer found it again with burnt wood in a pit-dwelling below a long-barrow of the Hanging Grimston group, E.R. Yorks. (*Forty Years' Researches*, 103, figs. 248, 249). These bowls are now referred to as the Grimston type, and are also found in Scotland (e.g. *Proc. Soc. Ant. Scot.* xxxviii, 26, 48).

Two good specimens (fig. 12), one nearly 4 in. long and slender, the other about 2½ in. and broader, now in the British Museum, were found with two skeletons adjoining on Huggate Wold, E.R. Yorks., and are illustrated by Mortimer (p. 308, figs. 918, 919). Another, with the greatest width just below the middle and nearly 2 in. long (fig. 4), rested below the hip of a skeleton, 'almost certainly of a woman' at Cowlam in the East Riding, as recorded by Canon Grenwell

(*British Barrows*, lvii, fig. 27, see p. 218), the barrow being a round one, 56 ft. in diameter. In a similar barrow of the Aldro group, E.R. Yorks., a lozenge-shaped specimen, with the point wanting, was found with remains of its shaft (fig. 12) in association with unburnt burials (Mortimer, fig. 117 on p. 59).

Recent excavations have demonstrated the Neolithic Age of plain round-bottomed bowls of a type found in Yorkshire and Scotland, but hitherto



Fig. 13. Flint arrow-heads and pottery bowls from a barrow at Towthorpe, E.R. Yorks.

of uncertain date, as their associations were indefinite; and with this agrees the arrow-head evidence recorded in the East Riding. A barrow (no. 18) of the Towthorpe group (Mortimer, p. 9, figs. 14-21) was 3 ft. high, with a circumference of 75 yds., and contained on the original level six skeletons in the small space of $5\frac{1}{2}$ ft. square. They had been placed in flexed postures with the heads in different directions; and with them were two small hemispherical bowls of pottery about 3 in. high and $4\frac{1}{2}$ in. across the mouth; also a lozenge point of black flint, 3.4 in. long, attached to a femur by pressure, a second 3.3 in. long under another thigh-bone, and five others of leaf pattern in the immediate vicinity (fig. 13).

The instances so far cited confirm the rule that leaf-shaped arrow-heads belong to long-barrows, which (in spite of Mortimer's objections, p. lxxxi) are accepted as distinct from, and earlier than, the round-barrows, and previous to the introduction of bronze, whether we are to regard them as neolithic or

aeneolithic, the latter being the favourite classification abroad. The next step is to examine the arrow-head types found with different burial rites, in association with datable objects such as celts, bracers (wrist-guards), the four classes of sepulchral ware, and daggers whether of flint or bronze.

The most natural flint implement to find with arrow-heads is the polished celt, which is besides datable in itself to some extent, as the evolution has been

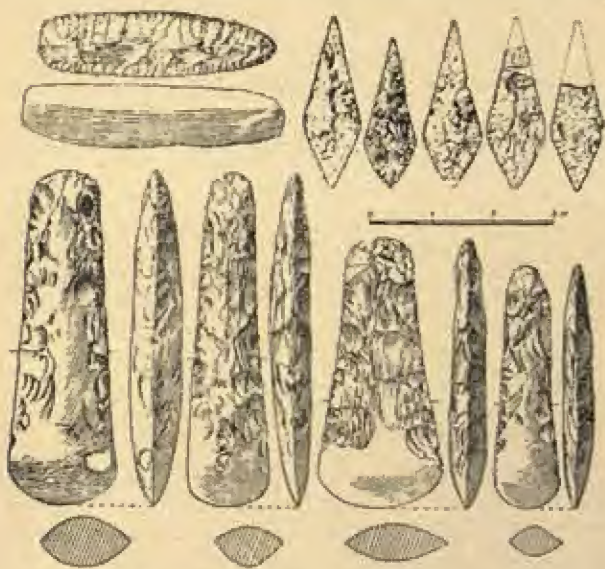


Fig. 14. Flints found together on Seamer Moor, N.R. Yorks.

well studied. The best case in England is the group (fig. 14) from Seamer Moor, N.R. Yorks., now in the British Museum (*Stone Age Guide*, 3rd ed., p. 104, fig. 100). The original account in *Fourn. Brit. Arch. Assoc.*, iv (1849), 105, is unsatisfactory, and is discussed in *Archæologia*, lxxi, 121. The discovery was made in Ayton East field on the southern edge of Seamer Moor, where a cairn was found within what seems to have been a long-barrow ('85 ft. from its base to apex in length, and 50 ft. from its base to apex in breadth'). The limestone cairn was 40 ft. from the exterior of the mound; and near the centre, at a depth of 8 in. from the surface,

was a thin flat stone 20 in. by 18 in., partly covering a few human bones, four flint celts, five lozenge arrow-heads and two other flints, boars' tusks, and minor objects. All these may have accompanied a skeleton, but in any case are clearly contemporary and useful on that account. The celts are partly polished, and all have the pointed oval section which is considered earlier than the squared sides of Dolmen celts in Scandinavia.

The same types of celt and arrow-head are again found in conjunction at Duggleby Howe, Towthorpe, E.R. Yorks. (Mortimer, figs. 56, 64). The Howe is flat-topped and circular, and contained a large number of interments, which were discovered on various occasions; but the grave marked G was opened and carefully recorded by Mortimer in 1890. 'An adult male, who probably had reached the age of sixty, was laid on his right side in a flexed position, with head to NE. In front of the chest was a hammer-head made of the base of a shed antler of the red deer, and near it was a diamond-shaped arrow-head of dark-coloured flint, which had lost its point (fig. 15). There was also a beautiful axe (celt) made of drab-coloured flint, 9½ in. long, with the broad cutting-edge towards the knees of the body. The hammer-head was laid on its edge,

showing that it had at the time of interment been held in that position by a shaft.

Beakers are more frequently found with arrow-heads in Britain, and have an international significance that helps to establish the chronology of the barbed and tanged variety. Two or three of this type with triangular outline (the barbs being almost in line with the tang) were found with two neolithic potsherds and a beaker near Peterborough, and were shown in illustration of this paper by our Fellow Mr. Wyman Abbott.

A beaker 7 in. high was found behind the head of a crouching skeleton 10 ft. below the top of an oval barrow on Monkton Down, Wilts. (Salisbury

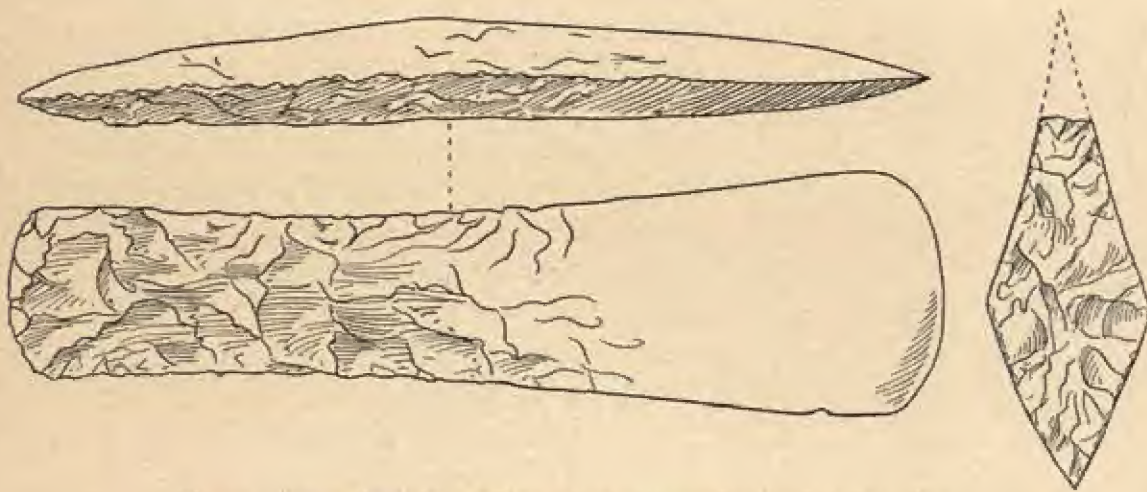


Fig. 15. Arrow-head (†) and flint celt from Duggleby Howe, E.R. Yorks.

vol. of Arch. Inst., 1851, no. 28, on p. 105, with plan and plates of objects). At the right foot was a small flint arrow-head (fig. 16), and larger flakes of the same material. The cist on Cwm Car farm, near Dolygaer, five miles north of Merthyr Tydfil, was not carefully examined, but the internal measurements given in *Archaeologia Cambrensis*, 6th ser., ii, 25, would be insufficient for any flexed skeleton but that of a child, being only 26 in. by 19 in. by 12 in. deep. Burnt bones are mentioned in the account, but a beaker was found in it, and this type is only exceptionally found with a cremation. When the earth thrown out from the bottom of the cist was examined, the arrow-head here illustrated was found (fig. 22), with no trace of burning. The pattern agrees well with beaker-burials elsewhere, as at Ditchling Road, Brighton, where an imperfect beaker and arrow-head (fig. 17) were found with a crouched skeleton by Mr. H. S. Toms, who has kindly furnished drawings.

Important evidence was obtained by Colt Hoare from a bell-shaped barrow at Fovant, Wilts. (*Anc. Wills.*, i, 239, pl. xxxiv), where burnt bones were

found in a heap $1\frac{1}{2}$ ft. below the summit, near the feet of one of two skeletons which were buried with a beaker near the head of the uppermost. The cremation may be assumed to be intrusive, but the primary burial was 11 ft. deep, where a flexed skeleton was found with a bronze dagger in a wooden scabbard,

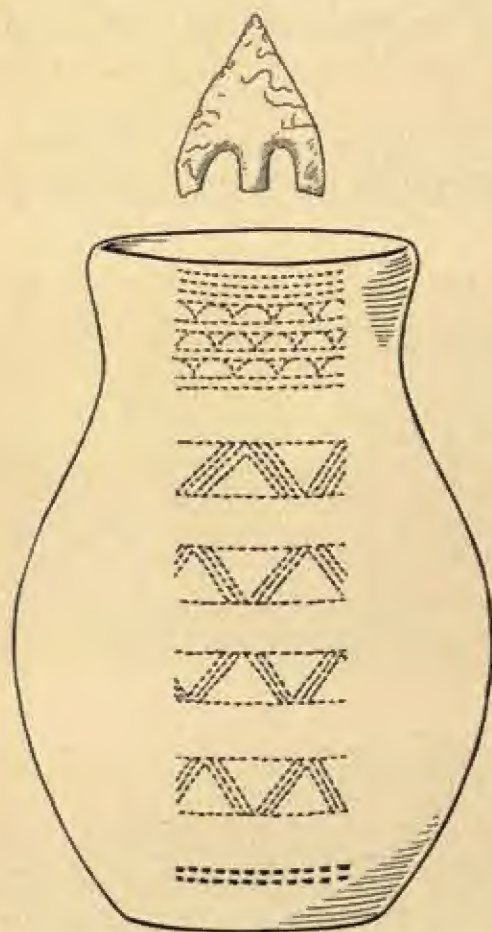


Fig. 16. Beaker and arrow-head from barrow, Monkton Down, Wilts.

two jet ornaments (with V-boring on the base and edge respectively), four arrow-heads, a small pin (probably an awl), and a fine beaker at the feet. Sketches have been made from the plate (fig. 18), which shows rather an advanced type of arrow-head for the beaker period. Somewhat similar is one (fig. 22) communicated by our Fellow Mr. O. G. S. Crawford from a burial accompanied by a beaker at Nodiam, Isle of Wight (Carisbrooke Museum).

More important cases of association with beakers are recorded from Wilts. and Derbyshire, where the datable elements are more numerous. Davis and Thurnam (*Crania Britannica*, pl. XLII) give the best account of a depressed round-barrow on Roundway Hill, near Devizes, in which a crouching skeleton was found $5\frac{1}{2}$ ft. below the summit, the grave being cut in solid chalk (*Wilts. Arch. Mag.*, ii, 185). A triangular arrow-head (fig. 19) was lying a few inches from the skull and a beaker was at the feet. A bronze dagger-blade 10 in. long, with tang but no rivet-holes, and a bracer of chlorite slate, with four holes for attachment to the wrist, completed the equipment of the skeleton, which was that of a brachycephalic man over 6 ft. in stature.

A Derbyshire parallel is also published in *Cran. Brit.* (pl. XLI) and has recently appeared in *Proceedings*, xxxii, 12, from another point of view. Green Lowe on Alsop Moor was opened by Bateman (*Vestiges*, p. 59) and found to contain a flexed skeleton in a cist of stone slabs, with a beaker behind the shoulders; a nodule of pyrites and small flint (for striking fire), a flint dagger 6 in. long, and, behind the back, bone implements and three barbed and tanged arrow-heads, approximately of triangular outline (fig. 20).

In many respects similar was the interment in a round barrow called Mouse Low, between Deepdale and Grindon, Derbyshire, which was opened in

1848 (*Ten Years' Diggings*, p. 115, not illustrated). In the centre was a cist of three large flat stones, the fourth side left open; on its paving was a stalwart

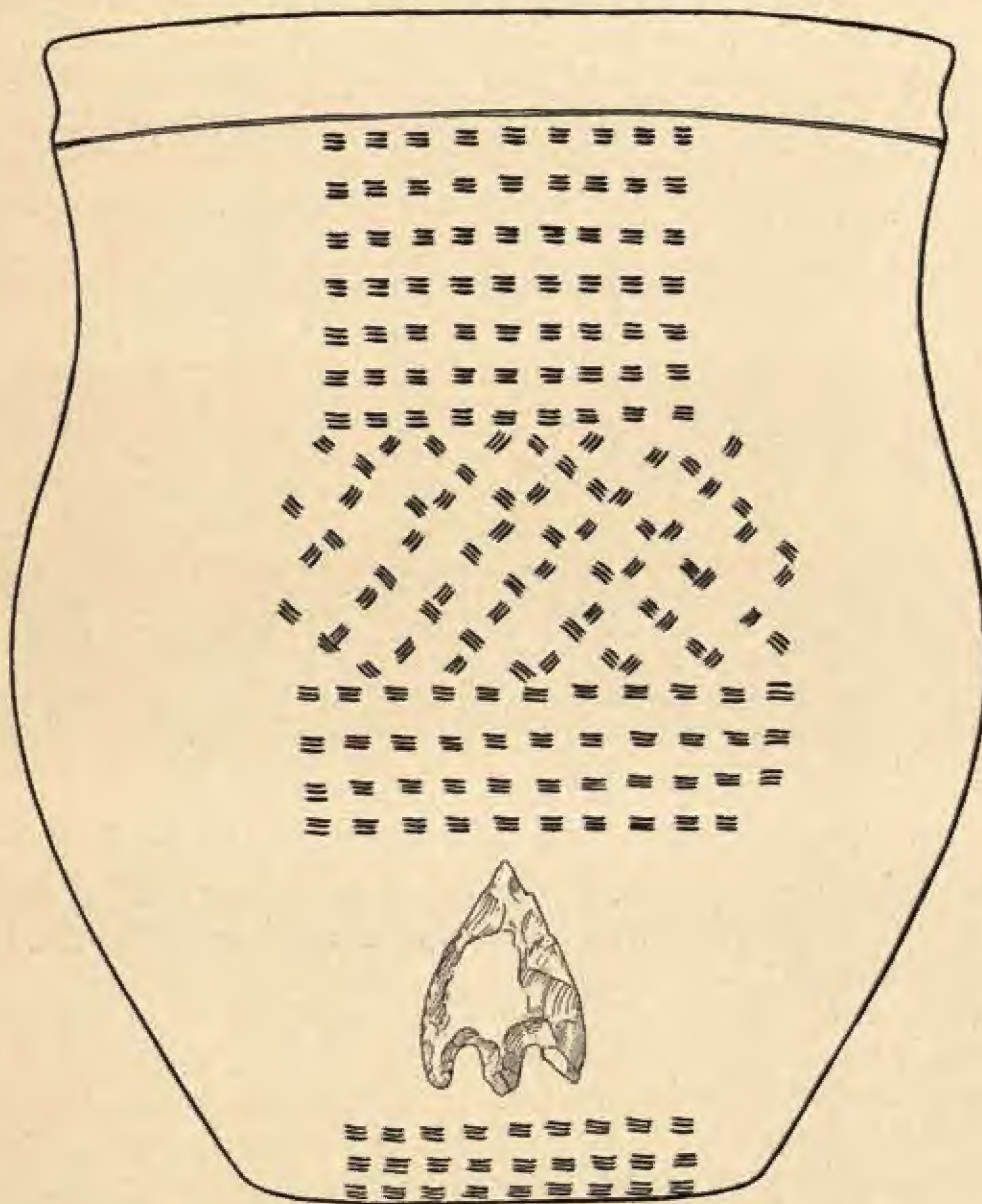


Fig. 17. Beaker and arrow-head, Ditchling Road, Brighton. (1)

skeleton in a contracted position, with a beaker near the head having two rib-bones of an animal inside it; also a spear-head and two barbed arrow-heads of white flint, two more lying outside the beaker (fig. 21).

An unburnt burial at Summertown, Oxford, was furnished with two beakers and a flint arrow-head (fig. 22) which are now in the British Museum. The style of the pottery is distinctly late and decadent, and it will be observed that

the tang of the arrow-head is broad and projects beyond the line of the barbs, unlike most of those found with the beaker type of pottery.

The form of three arrow-heads (one illustrated in *British Barrows*, 228, fig. 117) from a round-barrow in Thwing parish, East Riding (fig. 23) is quite in keeping with the beaker found in the same grave, which had been disturbed for an unburnt burial furnished with rings of jet; and Canon Greenwell suggested this sequence of events. One of the round barrows in the Lake group near Amesbury, Wilts., was found by Colt Hoare to have been opened before

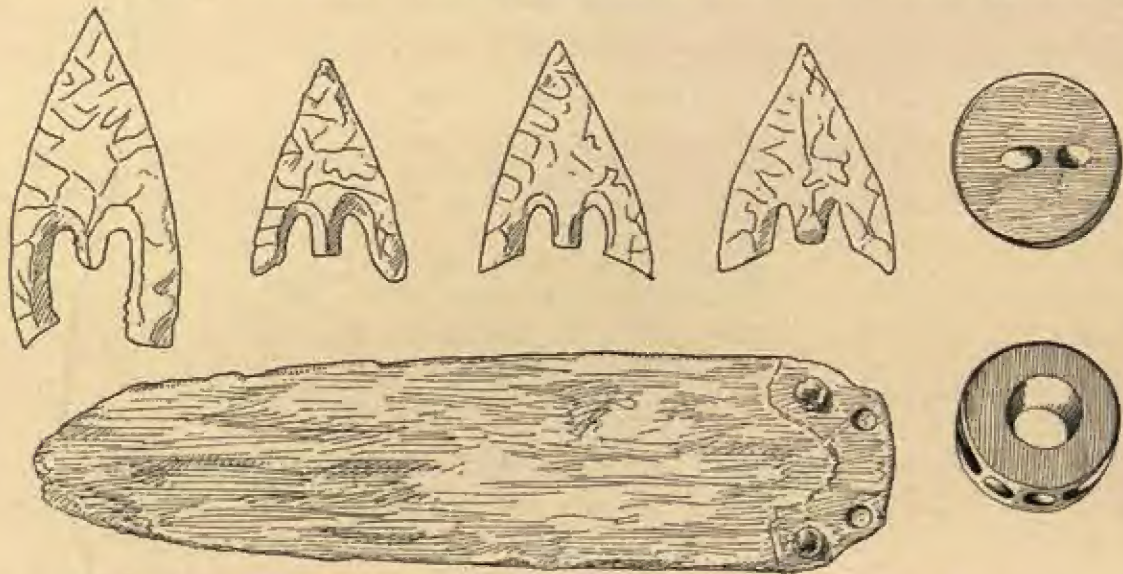


Fig. 18. Arrow-heads with jet ornaments and bronze blade, barrow at Fovant, Wilts. (1)

(*Ancient Wills*, i, 211, pl. xxx, no. 5); but amongst the earth and scattered bones he found some fragments of a fine beaker, some chipped flints, and a perfect arrow-head of flint (fig. 22).

A cist, opened in 1897 at Clinterty, Kinellar, Aberdeenshire, contained part of a male skeleton, an urn of the beaker type, a bone ring, flint arrow-heads (fig. 24), and a small flint implement. The skull was much broken, but the cranial index was calculated to be 84.3, well in the brachycephalic series (*Proc. Soc. Ant. Scot.*, xxxix, 434). Mr. Graham Callander has kindly procured outline drawings of the arrow-heads from the Curator of the Anthropological Museum of Aberdeen University. In a cist, 3½ ft. long within, at Dairsie, Fifeshire, a beaker and four flint arrow-heads (fig. 25) were found with a skeleton (*Proc. Soc. Ant. Scot.* xxi, 132-3, figs. 1, 2).

The flint type associated with beakers is therefore fairly uniform, as a line joining the extremities of the barbs and tang completes an equilateral triangle. This is in striking contrast to what may be considered the native neolithic pattern (lozenge- or leaf-shaped), and was clearly introduced by the Beaker

people from some district on the Continent which had been previously influenced by Spanish culture (p. 105). It was to these invaders or immigrants that Britain owed the bowman's wristguard or bracer already mentioned, from Roundway Hill, and also found at Tring Grove, Herts. (*Archaeologia*, viii, 429,

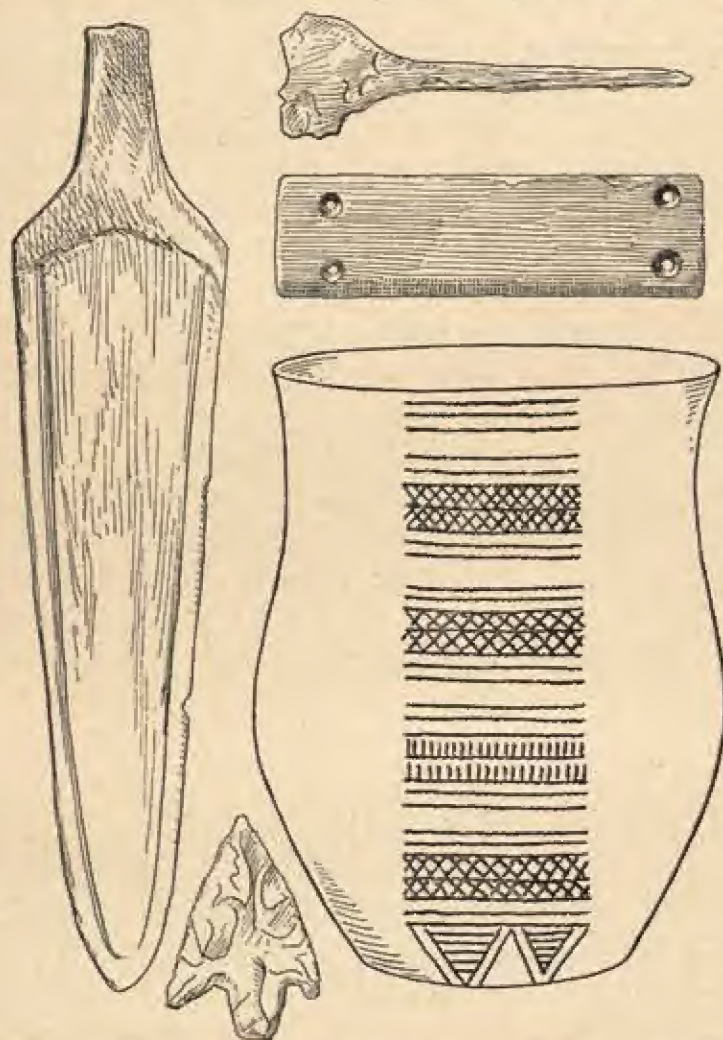


Fig. 19. Beaker, bracer, arrow-head, and bronzes from barrow, Roundway Hill, Devizes.

pl. xxx, fig. 6), in association with an arrow-head of the appropriate pattern (fig. 26), a jet ring and an unburnt burial.

The beaker and its companions were of foreign origin, but the native neolithic pottery is now held to have survived in the form of 'food-vessels', which are found both with unburnt and cremated burials in Britain, thus marking the revival of native culture and a revolutionary change in the funeral rite. At Rudstone in the East Riding, Canon Greenwell found a remarkable arrow-head (fig. 27) in a round-barrow (*British Barrows*, lxiii, p. 249, fig. 29) between the face of a male skeleton and a food-vessel (like his fig. 71).

The contents of a burial now in Dorchester Museum seem to come under this heading, but the urn is without decoration and therefore difficult to classify. A barrow on Conegar (Conygar) Hill, between Fordington and Winterborne Came, was opened by Mr. E. Cunningham in 1880, and the account has been kindly communicated by the Curator, our Fellow Captain Acland. The diameter was 70 ft., the height 14 ft.; and in the upper part were cremated burials. At 9 ft.

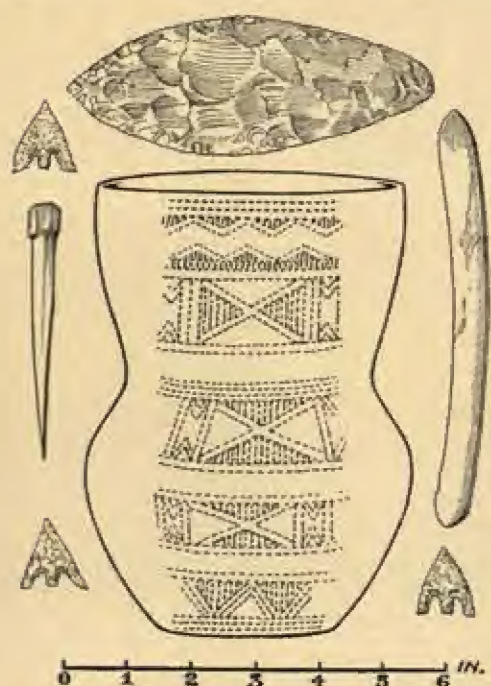


Fig. 20. Arrow-heads with beaker from Green Lowe, Derbyshire. ($\frac{1}{2}$)

from the surface a stone slab 7 ft. long, 4 ft. 2 in. broad, and 18 in. thick was found covering a crouched skeleton 13 ft. from the summit, with six arrow-heads (fig. 28) near the knee. Close to the body was a cremation, and an urn at the feet, 6 in. high (probably a food-vessel). In this case it might be argued that both rites were practised simultaneously. The arrow-heads are of foreign appearance, like some from Armorica illustrated in *L'Anthropologie*, 1900, 168; and Mr. O. G. S. Crawford thinks they are made of Pressigny flint from Indre-et-Loire.

Our Fellow Col. Hawley excavated a barrow $\frac{1}{4}$ mile south-west of Alton Parva farm near the village of Figcheldean, Wilts., and published an account in *Wilts. Arch. Mag.* xxxvi, 625. On the original surface below the barrow there was a rectangular cist in the centre, $7\frac{1}{2}$ ft. by $2\frac{1}{2}$ ft., and $4\frac{1}{2}$ ft. deep, containing a skeleton with the lower limbs bent. At the feet were

crushed remains of a pot, coarse, brown, and unornamented, perhaps 7-8 in. high. In front of the body, opposite the chest, was an ancient cup of the 'grape' type (fig. 29), with perhaps three rows of nodules originally stuck on the outside, but some now missing. The cup contains a little brownish-red matter, and a lump of burnt clay roughly conical in shape. Under it and staining it green was a small bronze knife with two rivets (fig. 29), $2\frac{1}{4}$ in. long, worn down very thin and pointed by repeated sharpening. With it were two arrow-heads of flint, barbed and tanged, with the barbs imperfect. All these objects are now in the British Museum as a gift from the Colonel. To find any pottery like an incense-cup in an unburnt burial is exceptional; but the 'grape-cup', which is almost confined to Wiltshire, has been found with skeletons at Windmill Hill (Avebury), and in the Manton and Normanton barrows (see note in *Devizes Museum Catalogue*, ii, p. 13).

When other grave-furniture is wanting, some indication of date is afforded

by the funeral rite, as inhumation seems as characteristic of the early Bronze Age in this country as cremation is of its later phases.



Fig. 21. Arrow-heads from Mouse Low, Derbyshire. (1)



CWM CAR NODIAM SUMMERTOWN LAKE

Fig. 22. Flint arrow-heads of various types. (1)



HELPERTHORPE THWING GANTON

Fig. 23. Arrow-heads from unburnt burials in Yorks. (1)



Fig. 24. Arrow-heads from Clinterty, Aberdeenshire. (1)

Fig. 25. Arrow-heads from cist, Dairsie, Fifeshire. (1)

The following instances may be cited to show the type or types of arrow-head found in unburnt burials. In a round barrow in Ganton parish, East Riding, Canon Greenwell found a barbed specimen (fig. 23) in front of the

face of a young subject, the head being the only part of the skeleton interred, or possibly re-interred after the mound had been disturbed for an adjoining cremation (*British Barrows*, xxvi, 171); and the association is confirmed by another case in Helperthorpe parish (xli, p. 191), where a barbed arrow-head (fig. 23) lay in front of the face of an adult skeleton.

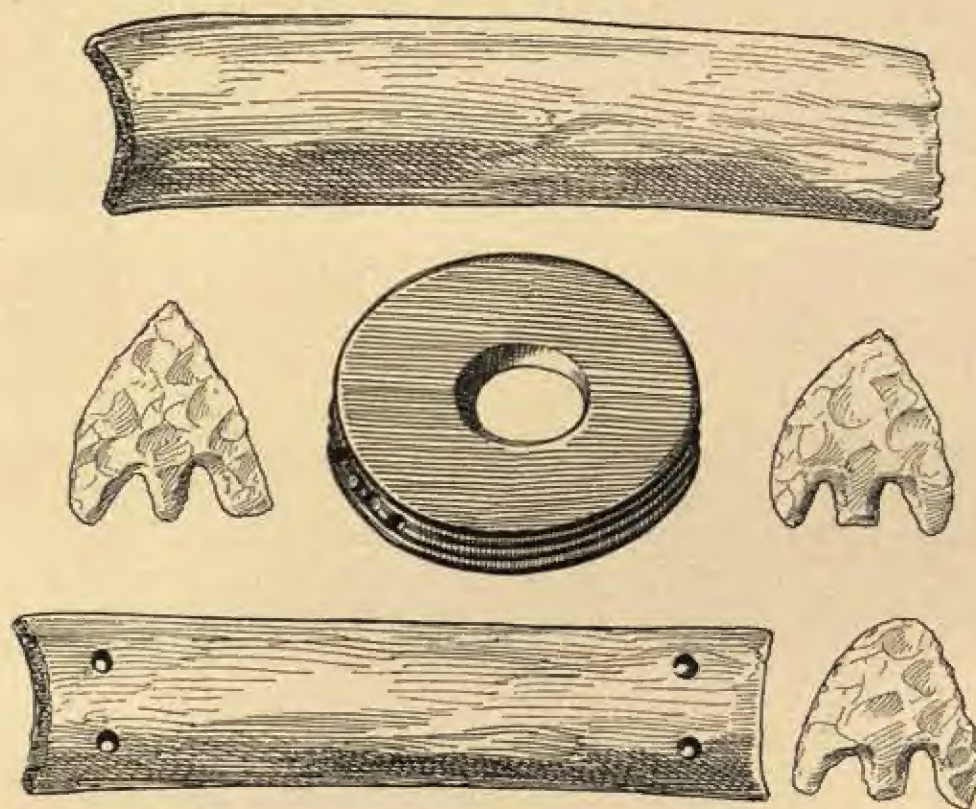


Fig. 26. Jet ring, bracers, and arrow-heads, Tring Grove, Herts. (†)

At Aldbourne, Wilts., a round barrow was excavated by Canon Greenwell (*Archaeologia*, lii, 48, no. cclxxvii) which covered a central interment in a grave 6 ft. by 3 ft. and 2 ft. deep, cut in the solid chalk. With the remains of a skeleton were found a bronze dagger and flint arrow-head (fig. 30); and though the grave had been disturbed for another inhumation, there can be no doubt that the arrow-head, in spite of its prominent tang, belonged to an unburnt burial.

Though not too well attested, two elaborate specimens from Cornwall are worth including, as they apparently belonged to an inhumation. The discovery was made by Mr. Cotton in the most northern barrow on Botrea Hill in the parish of Sancreed in 1826 (Borlase, *Nenia Cornubiae*, pp. 35-6). Two large stones set up on edge and parallel, about 15 in. high and 6½ ft. long, were found with a third stone 2 ft. 8 in. long at right angles, which formed one end

of a grave. In turning over the black earth with which the grave was filled the two flint arrow-heads were found (fig. 31).

A cinerary urn, found full of bones on the original surface below a round barrow in Slingsby parish, N.R. Yorks., contained also an arrow-head (fig. 32) of calcined flint, about $1\frac{1}{2}$ in. long, with the tang much more developed than the barbs (*British Barrows*, cxlv, p. 352, fig. 140). Another case in the North Riding was recorded in *Archaeologia*, xxxi, 304, pl. viii. In 1845 Mr. Colls found a cremated burial in an urn (no. 2), with a flint arrow-head (fig. 32), on Baildon Common, near Ilkley. The urn had been inverted over the bones, and was found at 2 ft. from the surface of barrow no. 10. At Hutton Buscel, in the same Riding, Canon Greenwell found part of a large arrow-head like fig. 27, which, like three other flint fragments, was calcined, amongst bones with a small cinerary urn in a round barrow (*British Barrows*, clvii, p. 368).



Fig. 27. Arrow-head from unburnt burial, Rudstone, E.R. Yorks. (†)

The following are cases of association with cinerary urns in Scotland, the reference being to the *Proceedings* of the Society of Antiquaries of Scotland.

Several burials after cremation were found in an urn-field (without mound or other surface indication) at Kingskettle, Fifeshire; and two arrow-heads (fig. 33) were found in one or two of the urns recovered (vol. lv, p. 42). Mr. Callander states that flint arrow-heads are rare in cinerary urns, but figures two other cases (*op. cit.*, pp. 44, 45): one with barbs and a broad tang (fig. 33), found with a bone pin and two urns at Foulford, Cullen, Banffshire; and five (fig. 34) from a cairn in the parish of New Kilpatrick, Dumbartonshire, all calcined. The variety of pattern in the group is remarkable, and

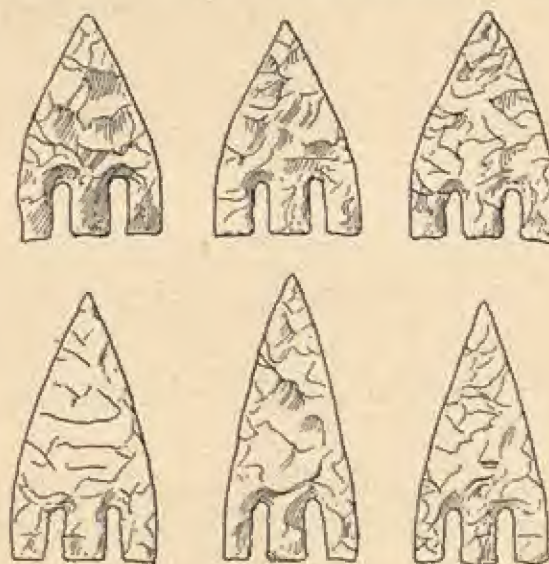


Fig. 28. Arrow-heads from a burial at Conegar Hill, Dorset. (†)

the inclusion of a leaf-shaped example in a cremated burial only confirms the Hutton Buscel evidence, and emphasizes the danger of relying on type alone as an index of chronology. Nevertheless, it is clear that these two examples only prove the rule established by dozens of others belonging to the same type.

Apart from cinerary urns, cremated bones are often heaped together under barrows; and Mr. A. D. Passmore communicates the discovery near Swindon

of a heart-shaped arrow-head found with a bronze dagger-blade, now $3\frac{1}{4}$ in. long, in a burial after cremation (fig. 35).

Thurnam found two barbed and tanged arrow-heads (fig. 32) with a flint knife in a round hole in the chalk below a barrow on the northern side of Morgan's Hill, Wilts., associated with ashes and burnt human bones, and rightly attributed

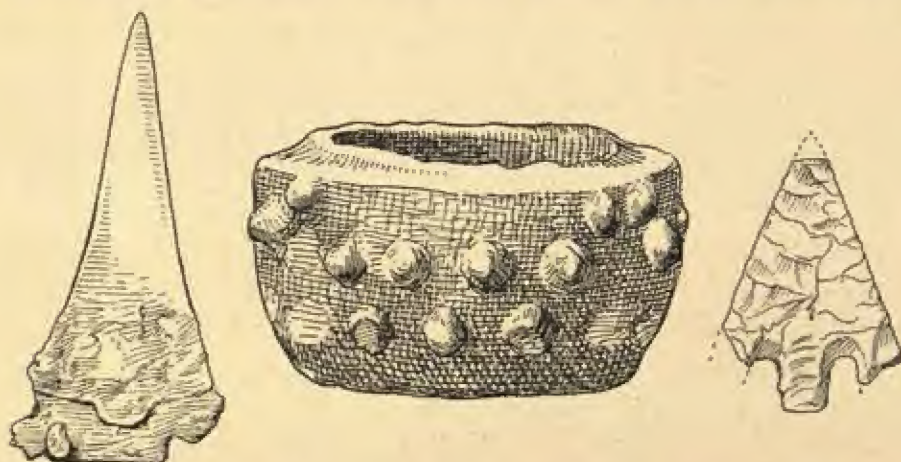


Fig. 29. Bronze blade, 'grape'-cup, and arrow-head, Alton Parva, Wilts.

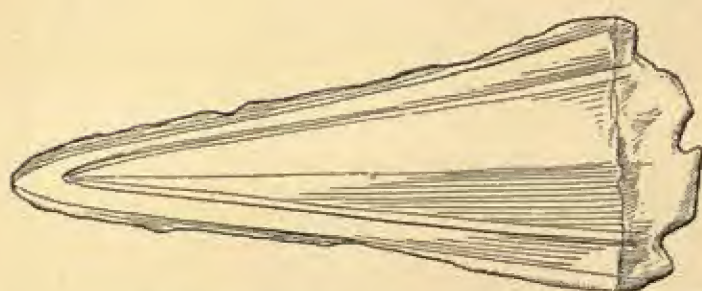


Fig. 30. Arrow-head and bronze blade, Aldbourne, Wilts. (f)



Fig. 31. Flint arrow-heads, Botrea Hill, Cornwall. (f)

the white and brittle condition of the flints to cremation (*Wilts. Arch. Mag.*, vi, 319; *Archaeologia*, xliii, 418, fig. 108; 420, fig. 111).

A discovery which much impressed Colt Hoare is recorded in his *Ancient Wiltshire*, i, 183, pl. xxii. In a round barrow (no. 17, marked Hunter's Barrow on his map) of the Everley group north of Chidbury Camp, he discovered, 3 ft. from the summit, the skeleton of a small dog, and nearly 6 ft. lower, on the original surface, burnt human bones and ashes piled in a heap with five flint arrow-heads (four illustrated, fig. 36) and a small red pebble, all 'surrounded by a circular wreath of horns of the red deer'—the antlers being the hunter's trophies and the dog his companion in the chase.

A cremation in Ribden Low, between Colton and Cauldon, Derbyshire

(Bateman, *Ten Years' Diggings*, p. 127), is peculiar in being well below a cist containing a flexed skeleton, though pieces of flint in the cist had all been



Fig. 32. Arrow-heads found with cremated burials. (†)



Fig. 33. Arrow-heads found with cremations in Scotland. (†)

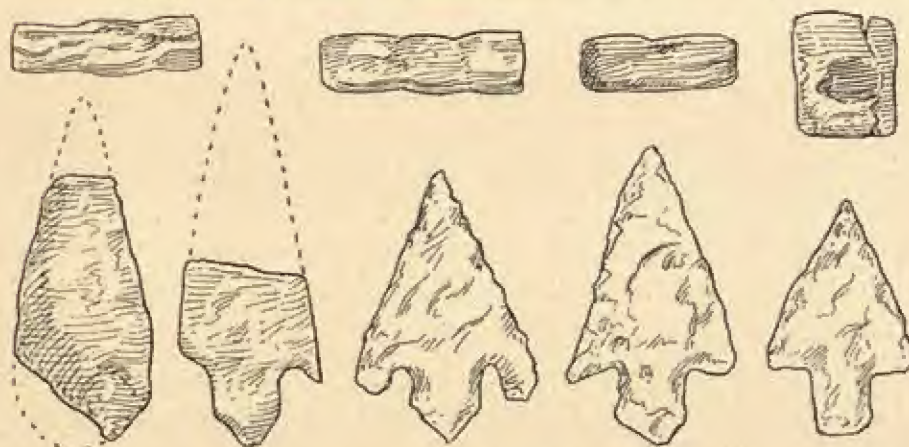


Fig. 34. Arrow-heads, &c., from a cairn, New Kilpatrick, Dumbartonshire. (†)

slightly burnt. In a hole 2 ft. lower were calcined bones on a stone pavement with three large flints and three barbed arrow-heads (fig. 37), also remains of bone tools, perhaps for netting. These and the Mouse Low sketches were kindly supplied by Mr. E. Howarth, curator of Weston Park Museum, Sheffield, where most of the Bateman collection is preserved.

FLINT ARROW-HEADS IN BRITAIN

At 45 ft. from the east end of a twin barrow on Roundway Down, near Devizes, was found an oblong cist cut in the chalk, 5 ft. 8 in. long, 2 ft. 5 in. wide, and 2 ft. deep, containing only a small heap of incinerated bones, three 'whetstones' (more probably bracers), a flint arrow-head (fig. 32) and flakes, a small bronze spear-head, a netting-needle, and other details. Whether the arrow-head belonged to a previous interment of an unburnt body or accompanied the cremation is uncertain, and the bronze indicates an opening in the

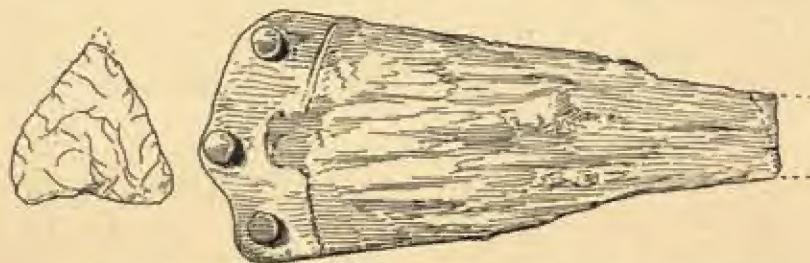


Fig. 35. Arrow-head found with bronze blade near Swindon. (†)

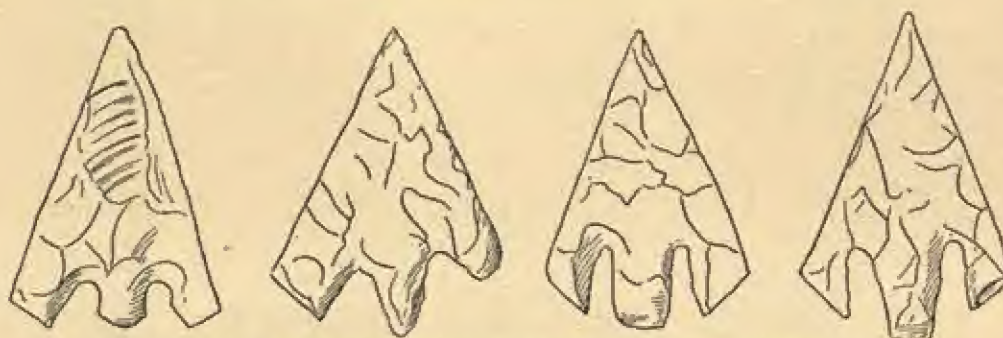


Fig. 36. Arrow-heads from a cremated burial, Everley, Wilts. (†)

Bronze Age; but the type agrees well with the arrow-heads found with incinerations, and must not be omitted (*Wilts. Arch. Mag.* vi, 163).

From a chambered cairn of circular form called Langass Barp, in North Uist, Outer Hebrides, came a tanged and barbed arrow-head (fig. 33), other flints, and cremated bones. Though not found in their original position, there can be little doubt of their association, as the arrow-head shows signs of its subjection to fire (Erskine Beveridge, *North Uist*, p. 247 and adjoining plate).

Incense-cups from Aldbourne, Wilts., are of elaborate form and special interest, fully illustrated by Canon Greenwell in *Archaeologia*, lii, pp. 51, 53. The first was associated with faience beads (which have given rise to much discussion) and lignite rings; the second, a few inches distant, was with cremated bones and covered with ashes in which were six flint flakes (unburnt), animal bones, and two flint arrow-heads—one barbed, imperfect but unburnt and the other triangular and partly calcined (fig. 38).

A flint arrow-head, found in true association with an incense-cup, should belong to the second half of the Bronze Age, when cremation was the funeral rite; but that from Herd Howe on Gerrick Moor, N.R. Yorks., now in the British Museum, is of the transverse type (*petit tranchet*) which was common in the Danish shell-mounds at least 3,000 years earlier. It did not cease with the beginning of megalithic building, and is well represented, for instance, in a late neolithic burial from Tours-sur-Marne in the British Museum, the associated celts being pointed at the butt or merging into the thin-butted type (*Stone Age Guide*, 3rd edn. 146, figs. 93, 181).

The transverse type was also found with a leaf-shaped flint (rather thick



Fig. 37. Arrow-heads from cremated burial, Ribden Low, Derbyshire. (†)

ALDBOURNE CHILDREY
Fig. 38. Arrow-heads of various types. (†)

for an arrow-head) in the Grotte du petit Thérain, Thiverny, Oise (*Rev. Anthropol.*, 1924, 201); and again with hollow-based arrow-heads in chambered barrows of Denmark (A. P. Madsen, *Gravhøje og Gravfund*, pls. ix, xi). This latter form is rare in England, and common in Ireland: it is found with the leaf-pattern in Mauretania (*L'Anthropologie*, xxx, 343), and in burnt burials with beakers near Znaim, Moravia (*Wiener Präh. Zeits.*, 1919, 43). It is unfortunate that the Childrey specimen (fig. 38) was found only in the material of a round-barrow, on the verge of the chalk escarpment overlooking the Vale of White Horse (*Archaeologia*, lii, 63), and all that can be said of one from Warcock Hill, at the south end of the Pennines, is that it lay under 3 ft. of peat and below the Bronze Age level (*Antiq. Journ.*, iv, 416). Dr. Raymond assigns this type in France to the aeneolithic period, and states that 'in Gaul as in Iberia and Italy they exist in association with an imported series so similar that it would be difficult to deny any relations at that period between these and oriental countries' (*Revue Préhistorique*, v, 171).

Two flint arrow-heads were found in the fosse of Arbor Low, Derbyshire, during the excavation organized by the British Association in 1901-2, and are illustrated in Mr. St. George Gray's report in *Archaeologia*, lviii, pl. XLII (see pp. 471, 475, 486). One of leaf-pattern (like fig. 5) was found at a depth of 3 ft. close to the limestone side of the fosse, whereas the second, which is barbed and tanged, was on the bottom of the fosse, more than 5½ ft. from the surface.

Mr. Gray was of opinion that the stone circle (cromlech) known as Arbor Low was therefore of the same date as the barbed and tanged arrow-head; and as the present paper shows that the type closely corresponds to those found with beakers, it will be seen that a good deal rests on this isolated find, but the leaf-shaped specimen in the filling of the fosse has still to be explained, and the evidence all points to a neolithic date for that fragile relic. Mr. Gray adds in a footnote that 'the date of construction of Arbor Low appears to tally precisely with Prof. Gowland's deductions as to the date of the erection of Stonehenge, from evidence derived from his excavations there in 1901'.

Though inferior to grave-finds as evidence, certain discoveries by Mr. Hazzledine Warren on the Essex coast may be mentioned as suggesting an overlap of the leaf-shaped type with barbed and tanged examples. A buried prehistoric surface has been noticed in several places (as at Hullbridge and Walton-on-the-Naze), with a clay deposit below it, regarded as hill-wash or rain-wash. Both these levels have yielded flint instruments, the lower generally of weathered flint and primitive forms, the upper of black unweathered flint and better finish (*Essex Naturalist*, xvi, pp. 49, 274); and barbed and tanged arrow-heads are said to be more abundant on the earlier level. This, however, is not surprising if the type was introduced by the Beaker-folk who invaded the country, and would often have come into conflict with the natives who used leaf-shaped arrow-heads.

A study of the associated finds hardly supports the view expressed by Sir John Evans fifty-four years ago (2nd ed., p. 370): 'Whatever may have been the order of the development of the forms, it would in my opinion be unwarrantable to attempt any chronological arrangement founded upon mere form, as there is little doubt of the whole of these varieties having been in use in one and the same district at the same time, the shape being to some extent adapted to the flake of flint from which the arrow-heads were made, and to some extent to the purpose which the arrow-heads were to serve'—whether for hunting or warfare.

A stage in the evolution of the arrow-head barely represented in Britain may be inferred from published specimens abroad which include pointed-oval and tanged specimens almost of the same outline.¹ A pair of notches towards the lower end would be useful for attaching the shaft, and a slight constriction

¹ Illustrations in de Mortillet's *Musée Préhistorique*, 2nd edn., figs. 490, 492, 493 (Aveyron). Other French areas are represented in *Compte-rendu* of Autun Congress (Prehistoric Society of France), p. 337 (Burgundy); 340 (Saône-et-Loire), cf. *L'Homme Préhistorique*, 1903, 37; and 1904, 133 (Côte-d'Or). The type is also found in the Fayûm, Egypt (*L'Homme Préhistorique*, 1907, 263) and at Abydos (J. de Morgan, *Prehistoric Man*, p. 81); Tunis (Autun Congress, 362), and Algeria (*L'H. P.*, 1904, 112-13).

below the notches would produce a tang, the barbs being a later development, perhaps due to the Beaker people. Some of the specimens found with cremations in Britain (e.g. fig. 33, Kingskettle) may be derived rather from the leaf pattern than from the barbed and tanged variety characteristic of the early Bronze Age; and this connexion is borne out by several examples from Italy in the Sturge collection at the British Museum (cf. Morelli, *Iconografia della Preistoria Ligustica*, pl. LIII).

Reference has been made above (p. 95) to British types found also in Spain, and few would now deny some connexion with the Iberian peninsula in the Aeneolithic period. Without deciding between the different routes suggested for this movement, it will suffice here to refer to an analysis of Basque and Catalan arrow-heads in *L'Anthropologie*, xxxv, 418, 432, 440, and to the suggested sequence of types in *Prähistorische Zeitschrift*, 1924, 102-4, where barbs and tang are assigned to an early stage of the Aeneolithic. Brittany was nearer the focus of Beaker-civilization, and types of arrow-heads are figured from burials in Armorica in *L'Anthropologie*, 1900, 166-8, some being reproduced in Nils Åberg's *La civilisation énéolithique dans la péninsule ibérique*, p. 175.

The present survey has no claims to completeness, and more material should, and no doubt will, be collected before the sequence is demonstrated in full; but it would be strange if nearly sixty cases of association provided no basis for a classification, and further research may establish as rules certain associations that occur repeatedly in Britain. Thus the leaf-shaped arrow-head of medium size is characteristic of chambered long-barrows and Scottish cists, which are definitely early in the barrow series, and are generally classed as Late Neolithic. On the other hand, the larger leaf-shaped and the angular or lozenge types are found in round-barrows or in barrows of irregular outline, and seem to follow the birch-leaf type. Quite distinct is the remarkably homogeneous class found with beakers, and therefore presumably introduced by foreign invaders. The barbs and tang are almost in a horizontal line, and the average size is small. Others from unburnt burials not otherwise dated are more developed, and have the barbs developed at the expense of the tang; whereas in cremated burials the tang is exaggerated in length or breadth (sometimes both) and the barbs are smaller than before and sometimes rudimentary. This reversal might be explained if any reason for the change from inhumation to cremation could be given, but the uninterrupted development of sepulchral pottery negatives a second invasion of the country during the food-vessel period.

DISCUSSION

Mr. WYMAN ABBOTT felt that more information was wanted to decide whether flint arrow-heads continued in use after the Bronze Age. He knew of a site occupied continuously from the beginning of the Neolithic to the Roman period, where associations proved that a crude form of the leaf pattern was used throughout the occupation; and on two occasions he had found the leaf-shaped arrow-head (not the lozenge) strictly associated with La Tène pottery. The beaker-type of arrow-head seemed to be fixed, but more evidence was required for the later periods. Besides the traditional local form, specimens might be introduced into one district from another. Though the graves showed that individuals carried only a single type, importation would explain the mixture of types in other cases.

Mr. GARRAWAY RICE had collected a large number of arrow-heads, and no flints had been more popular with collectors since the seventeenth century. Most of them had evidently been lost or shot away, and it would be interesting to arrange stray finds in chronological order. He knew of arrow-heads and flint flakes found with cinerary urns in the Ashford urnfield; and hoped that more care would be taken in the future to note associations, on which could be based a classification of the whole series.

Mr. EDWARD WARREN lived in Berkshire, where such finds were common, and was specially interested in the method of hafting. Such heads were difficult to fix, and after being used two or three times would work loose. Locally he knew of lance-heads and daggers of flint not so shapely as the largest shown on the screen.

Mr. SMITH replied that one lozenge-shaped specimen from Aldro had been published by Mr. Mortimer, with enough of the shaft to show the method of attachment; and in the collection of Mr. Knowles, of Ballymena, there had been four from co. Antrim with the part once covered by the head of the shaft indicated by a difference in colour. A ligature round the split shaft would secure the head sufficiently, and notches for the purpose were found on some specimens. In the British Museum was a transverse arrow-head from Denmark still in its shaft and with the binding intact.

The CHAIRMAN (Mr. Emery Walker) expressed the gratitude of the meeting for a paper that had been of interest even to those not previously familiar with the subject.

V.—*The Origin of the Scandinavian Style of Ornament during the Migration Period.* By DR. HAAKON SHETELIG, Hon. F.S.A.

Read 15th April 1926

IN preparing this paper¹ I have tried to choose a subject of equal interest to both our countries. The peculiar decorative style of the Migration period is common to Anglo-Saxon England and to Scandinavia; and with equal ardour archaeologists on both sides have been engaged in solving its fascinating problems. Especially in recent years English antiquaries have made most valuable contributions, which seem to call for a revision of current Scandinavian opinions about these questions. In acknowledgement of the high merits of English archaeology in this complex and difficult research, I shall try to set forth how far a Norse student may accept the explanation offered by eminent English scholars like Dr. Ellis Minns and Mr. Reginald A. Smith.

The peculiar style of decoration developed by the northern Teutonic peoples in the Migration period flourished chiefly during the sixth century. In a definite form it did not appear till the latter half of the fifth, and it has no precedents in early Germanic industry. The style displays its best qualities in the decoration of large square-headed brooches of silver-gilt, partly with garnet inlay: the surface is crowded with ornament, while the edges are boldly indented, and enriched with openwork animal-heads or with broad and grotesque masks as terminal decorations. The motives of the ornament are generally animals, not rarely human figures, and sometimes birds. The human form is certainly more common than usually supposed, the face being treated in a manner different from the beasts' heads, and probably both the artists and the connoisseurs of the time were able to distinguish and appreciate this variation of design. It is even probable that much of the decoration appeared to the initiated as figure subjects representing myths, which are hardly accessible to modern students. On some early specimens of the fifth century, when the stiffening of the form was not yet so far advanced, certain intelligible scenes are easily detected, as on a brooch from Trondhjem—a man

¹ I have to thank the following institutions for lending me illustrations: *Bergens Museum*, Bergen; *Universitetets Oldsaksamling*, Oslo; *Videnskaps-Akademiet*, Oslo; *Kgl. Videnskaberens Selskab*, Trondhjem.

struggling with a crowd of ferocious monsters (fig. 18). But also later, in spite of the extreme schematizing of the figures, the compositions have much variation, and give the impression that they are something more than pure and meaningless decoration—that they were, in fact, regarded as living forms, handled by intelligent masters. For this branch of our study we have, of course, to choose for examination the very best specimens, as for instance some Danish brooches where figures of men and beasts are distinguished at first glance, a sword-pommel in Bergen decorated with a man and several animals, and the mountings of the Taplow drinking-horn where all the ornamental figures show human faces and human hands (fig. 6). A detailed analysis of the ornaments from this point of view would repay the labour involved.

The Migration style has certainly no very high artistic qualities, though undoubtedly higher than the current archaeological estimate. The bright gilding and crowded ornament give a most striking effect, which is undoubtedly intentional; the moulding of the relief is delicate and well arranged. Still, this Teutonic style had, like all other forms of art, a psychology of its own which should be taken into account in estimating its merits. The task here is something like deciphering a lost language; much formal work has to be done in establishing the meaning of sounds and the rules of grammar, before we may proceed to examine the contents and value of the texts. In the study of Migration ornament we are still at the stage of mere formal investigation, and long training is required to eliminate the first impression of stereotyped profusion. Then only can we attempt to see the elements of design as they first appeared, as new and interesting creations, each creation with its own special character and beauty. To be just, we ought to remember that this was the very first time in the existence of the Teutonic peoples that they faced the problem of giving artistic form to the images of living beings. To the Teutons themselves it must have seemed a triumph when they succeeded in mastering the form in their own way.

The style at the time of its *floruit* in the sixth century is equally represented in England and all Scandinavian countries by specimens of identical form and technique. The fact is of much importance, proving that the style was not a local feature, spreading by exportation of finished productions. The same style is applied everywhere to special types of brooches and other ornaments characteristic of the different countries. The large square-headed brooches certainly had a wide distribution, but distinct variations of the form bear signs of local manufacture (figs. 1-3). As types confined to their own province we may mention the brooches of Gotland with rounded head-plate (fig. 7), the large symmetrical brooches of northern Sweden and Finland (fig. 8), and the late Prussian type of cross-bow brooches (fig. 9). Of other decorated



Fig. 2. Silver brooch from Dalum, Norway
Oslo Museum



Fig. 1. Silver brooch from Bifrons, Kent
From *The Arts in Early England*, Vol. iii, Pl. LXII
by courtesy of Professor Baldwin Brown
and Sir John Murray

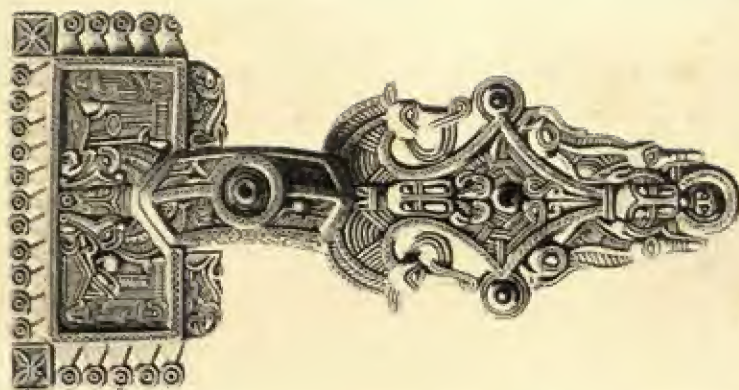


Fig. 3. Silver brooch, Denmark
From *Antiquar for Nordisk Oldkyndighed*
og *Historie*, Copenhagen, 1880



Figs. 4 and 5. Gold mountings, Norway
 From *Norske Guldfund fra Folkvandringstiden*, by courtesy of Johs Bpø, Bergens Museum



Fig. 6. The Taplow Horn; detail of mounting
 From *The Arts in Early England*, Vol. iii, Pl. LX
 by courtesy of Professor Baldwin Brown
 and Sir John Murray



Fig. 7. Silver brooch, Gotland
 From Salin, *Die Altgermanische
 Thierornamentik*, Fig. 118



Fig. 8. Silver brooch,
 Northern Sweden
 From Åberg, *Den Nordiska
 Folkvandringstiden Kro-
 nologi*, Fig. 122

objects we recall the clasps of different types in Norway and England, sword-handles (fig. 10), metal mounts of horns and other vessels, &c.

In France and Germany the style is poorly represented, and only by indifferent specimens. Here this style of ornament was mostly used on the square-headed brooches which were on the Continent a foreign type, imported from Scandinavia or possibly from England; the ornamentation was then imitated as part of the type itself. Salin first found this explanation of the debased design of the continental series, and his opinion is confirmed by recent researches. The Merovingian Franks and their German neighbours apparently preferred settings of precious stones to animal decoration, while the Lombards of northern Italy have left good examples of the Migration style in metal work. In Hungary the style is found chiefly in the initial stage of the fifth century.

The geographical distribution of the style is of some importance in regard to the problem of its origin. In recent years stress has been laid upon the numerous and prominent antiquities of this kind preserved in England and Norway, and the conclusion drawn that the style originated in these Western countries, inspired by the late Roman industry of Gaul. A. W. Brøgger has suggested 'the North-Sea Style' as the proper appellation, to indicate its origin and principal area of distribution, while Salin's Style II should be called the Continental, as being chiefly confined to the central parts of Europe from the Baltic to Italy. These views, as we have seen already, are not supported by the materials actually to hand. To judge from the decorated objects, e. g. from Prussia or from Gotland, the style must have been as much at home in Baltic countries as anywhere else, and the greater number of specimens preserved in Norway and England may be explained in other ways, as by different customs regarding grave-furniture. The apparent predominance of such works of art around the North Sea is not to be taken as indicating the origin of the style. The problem must be studied on broader lines, in connexion with the general history of the time.

The theories set forth by Scandinavian archaeologists are well known, and belong to two opposite schools. Dr. Sophus Müller, in giving his masterly and exhaustive analysis of the style in 1880, arrived at the conclusion that the Migration style, as he first called it, had sprung up spontaneously, as an expression of genuine Germanic spirit; while the Swedish archaeologists from Hildebrand to Salin claimed classical Roman influences as the foundation of the later evolution in Teutonic art. I need not repeat the arguments drawn up on both sides, Dr. Müller insisting on the formal qualities of Teutonic ornaments, so primitive and deeply original in conception, Söderberg and Salin on the other hand searching for links of connexion with late Roman industry. The latter opinion was the one generally accepted by Scandinavian archaeo-

logists, but in recent years a third theory has gradually gained ground, and is at present the explanation most widely accepted. It is the theory proposed by Dr. Ellis Minns in his admirable work on South Russia. According to him, western Asia was the ultimate source of early Teutonic art, and it was from the Scythian culture of South Russia that the Goths acquired the taste for animal ornament, which subsequently spread to other Germanic peoples, to Scandinavia and England. Dr. Minns says:

This much seems clear: that the Siberian art as exemplified in the Novocherkassk treasure would lead on to the Gothic style, the ornamental style of the barbarians that overran the Roman Empire. Specimens of this work are distributed from Stockholm to Spain and from Ireland to the Caucasus, but there seems good reason to suppose that it arose in southern Russia, where alone could be a meeting point of the various influences of which it shows traces. The chief characteristics of the style are great love of beast-forms, especially those of birds of prey, whose representations, reduced to a hooky beak and an eye, persist when all the other lines have become purely geometrical, &c. The beast-style seems to derive from Scytho-Siberian, the bright stones from the East, probably from Persia; but the mixing of these streams was not effected without Greek help.

Dr. Minns is followed by Strzygowski, by Rostovtzeff, and lately by Reginald A. Smith in his clear and explicit guide to the Anglo-Saxon antiquities of the British Museum, where a bronze casting from Anánino in South Russia is illustrated for comparison with Germanic ornaments. Thus the theory is supported by leading authorities on European archaeology; but at the same time it should be observed that the argument rests mainly on general reflections, upon likeness and probability, and has not yet been worked out by detailed proofs of derivation. Of course this problem has been to Ellis Minns and to Rostovtzeff a side-issue, of little importance to their work as a whole; and I beg to express my appreciation of their outstanding studies in Russian archaeology.

In the first place it should be remembered that we do not know very much of the native art of South Russia during and just before the Gothic occupation; and even less, perhaps, is found to illustrate the civilization of the Goths in their new homes. It is not conclusive to compare examples of Scythian art of the fifth and sixth centuries B.C. (such as the bird's head with hooked beak) with examples of Teutonic ornament in Germany of the seventh century A.D. Granted that some forms are surprisingly similar; but parallel facts are no proof, when so widely separated in time and place. The works of Scythian art of the best period had been buried in the Kurgans for long centuries when the Goths first approached the Danube and the Black Sea, and in the same way the civilization of Anánino had then long ceased to flourish. Consequently, we shall have to indicate which were the models of oriental art that the Goths could have seen

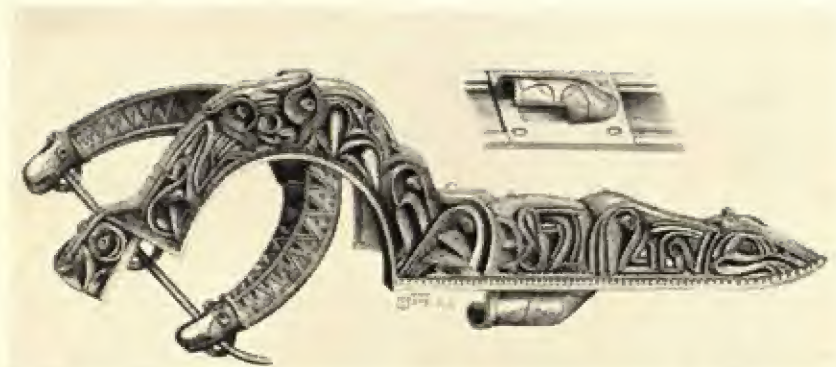


Fig. 9. Crossbow brooch of Prussian type, Curland
From Aspelin, *Antiquités du Nord Finno-Ougrien*, Vol. v, Fig. 1847



Fig. 10. Sword handle, Snartmo, Norway



Fig. 12. Teutonic brooch of gold filigree,
Sackrau, Silesia

From Grempler, *Der II und III Fund
von Sackrau*, Taf. iii, 3

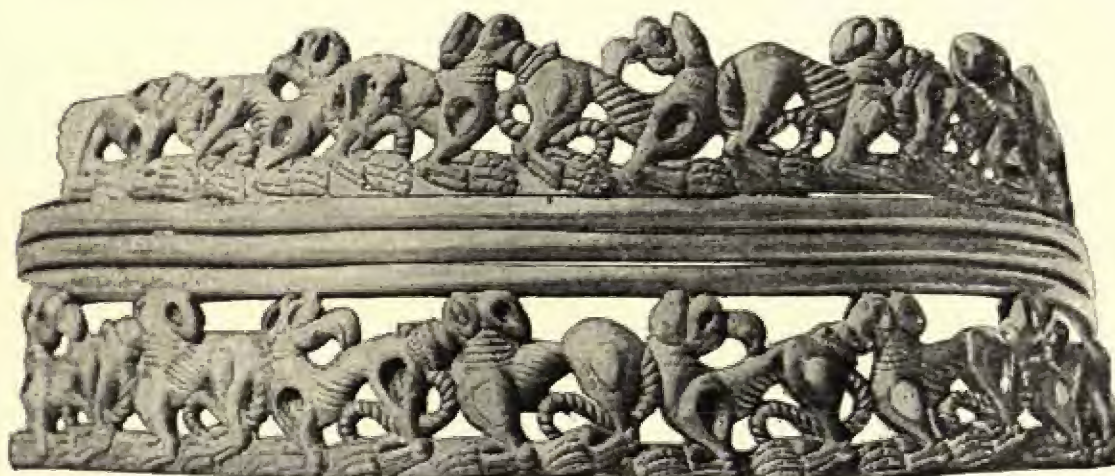


Fig. 11. The Novocherkassk gold collar

From *Scythians and Greeks*, by courtesy of Dr. E. H. Minns
and the Cambridge University Press



Fig. 13. Collar of gold pendants of South Russian origin,
Sackrau, Silesia

From Grempier, *Der II und III Fund von Sackrau*,
Taf. iii. 10-17

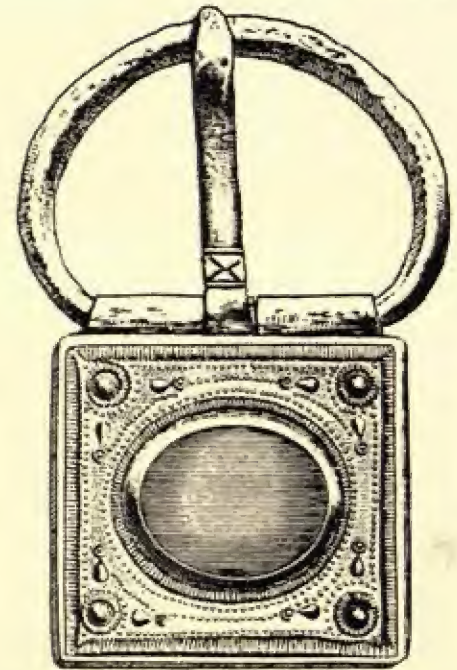


Fig. 14. Buckle with silver decoration
and set with a rounded stone

From Grempier, *Der II und III Fund von Sackrau*, Taf. iii. 19



Fig. 15. Piece of armour with silver decoration

From Engelhardt, *Thorsbjerg Mosefund*, pl. 11, 47

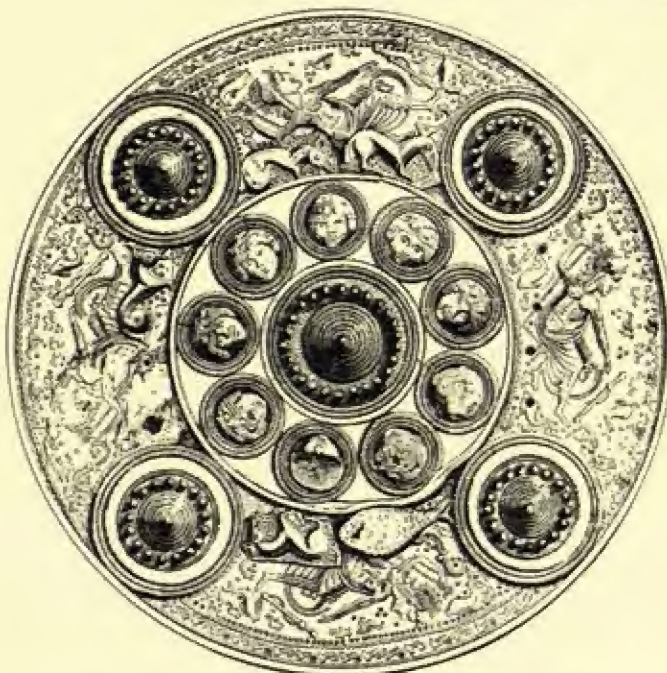


Fig. 16. Bronze phalera with silver decoration

From Engelhardt, *Thorsbjerg Mosefund*, pl. 6, 1



Fig. 17. Silver cup, Denmark

From S. Müller, *Ordning af Danmarks Oldsager*,
fig. 313

and copied after they had established themselves on the shores of the Black Sea.

As pointed out by Ellis Minns, the principal document is the Novocherkassk treasure, including the magnificent gold crown set with an intaglio, bearing the bust of a Roman empress, a double gold collar, and other precious articles. The treasure is dated third century A.D.; and the horned deer attached to the upper edge of the crown undoubtedly reveal that early Scythian art was still a tradition in South Russia. The small perfume bottle is purely oriental in form and decoration, and probably imported from the East; while the collar with its friezes of animals looks more barbaric, and is perhaps most characteristic of the local industry of the period (fig. 11). Dr. Minns is undoubtedly right to insist on this last ornament as being of great importance for comparison with some specimens found in Scandinavia of the third and fourth centuries. Dr. Minns's statement goes far towards explaining the problem with which we are concerned. The Novocherkassk collar was certainly not unique. A mixed lot of valuables of this kind must have been among the spoil when the conquering Goths entered South Russia.

Another example, showing what sort of industrial art was in Gothic possession at this period, is given by the Petrossa hoard, the nationality of which is evident by the gold ring bearing a runic inscription.

It is no surprise that Graeco-Roman and oriental treasures passed into Gothic possession. As is well known, the Goths from the Black Sea raided the coasts of Greece and Asia, and two important documents still extant make it highly probable that individual Goths occasionally found their way eastward as far as India. Two inscriptions in a Buddhist temple of Junnar, in the Poona district, to the north-east of Bombay, are made to commemorate the Goths Irila and Cita as donors respectively of two cisterns and a dining-room to the monastic establishment. The name Irila is at once recognizable as typically Gothic, and Cita is meant to be the Indian rendering of a Gothic Skildur, old German Scilto, identical with Scandinavian Skjaldr. The inscriptions are dated in the second century A.D., rather early for the appearance of Gothic travellers so far eastward, but the interpretation seems quite conclusive.¹

Thus the Goths had every chance of being familiar with the civilization of Asia and Greece, and at the same time they were in close contact with the Romans, Goths serving in the imperial armies and sometimes in high positions. The invention of runes in the second or third century is proof that some of them, even at this early date, must have been versed in Greek and Roman script. The historical situation is clear, and the next question is, how far and in what forms it affected the evolution of Teutonic industrial arts.

¹ Sten Konow, 'Goths in Ancient India' (*Journal of the Royal Asiatic Society*, 1912, p. 359).

We are at a loss for native Gothic antiquities of the third and fourth centuries from South Russia, but happily the deficiency is largely remedied by what is found in more northern regions. All Teutonic tribes between the Baltic and the Black Sea maintained constant communication, and most important elements of Gothic civilization reached the nations of Hungary, of Poland, of eastern Germany and Scandinavia. A new cultural movement, starting in the third century, had its sources in the south-east of Europe, and gradually transformed the state of things in the greater part of Teutonic territories. The most prominent characteristics of this new civilization are the abundant importation of productions of classical manufacture, such as drinking services of bronze and silver, glasses, and Roman silver coins; and the spreading of early runic inscriptions and objects decorated with filigree work (fig. 12), or thin plates of pressed silver-gilt (fig. 14). Most probably this movement accompanied a back migration northwards of families or tribes which had for some time lived in South Russia or on the Danube, or had served on the Roman frontiers; the different characteristics first mentioned give a picture of Gothic arts and civilization in this period. It is well illustrated by the three royal graves of the late third century discovered at Sackrau in Silesia, in the neighbourhood of Breslau. The graves had a most lavish furniture of Roman things, such as bronze vases, a small bronze table, glasses, a casket, some coins, decorated girdle mounts, besides pottery, brooches (fig. 12), and other personal ornaments of native Teutonic make. There are only two things in the graves which denote the connexion with South Russia, viz. a collar of leaf-shaped gold pendants, a typical specimen of the Graeco-Sarmatian industry (fig. 13), and the buckle with silver decoration, set with a cabochon (fig. 14).

The graves of Sackrau give a striking impression of Teutonic civilization towards the end of the third century—a civilization which had its centre in South Russia, influenced by imports of Roman industry, and possessing native metal-work in filigree of gold and silver, but in this case without any example of animal ornamentation. This lack may be accidental, and is supplied by other discoveries. The deposit in Thorsbjerg moss in Slesvig consists of spoil from a battle-field, chiefly of arms indicating an equipment more than half Roman. These weapons were certainly borne by men that had lived in very close touch with the imperial armies, and the Thorsbjerg 'find' as a whole is an exact illustration of the back migration northwards, that brought so many new elements of civilization to the Teutonic regions of the North. Among the objects from Thorsbjerg, now preserved in the museum at Kiel, we also meet some notable decorated pieces: a shoulder-piece of bronze armour, plated with pressed silver-gilt, with a frieze of hippocamps and other fantastic monsters (fig. 15); two phaleræ of bronze, silver, and gold, with images of classical gods

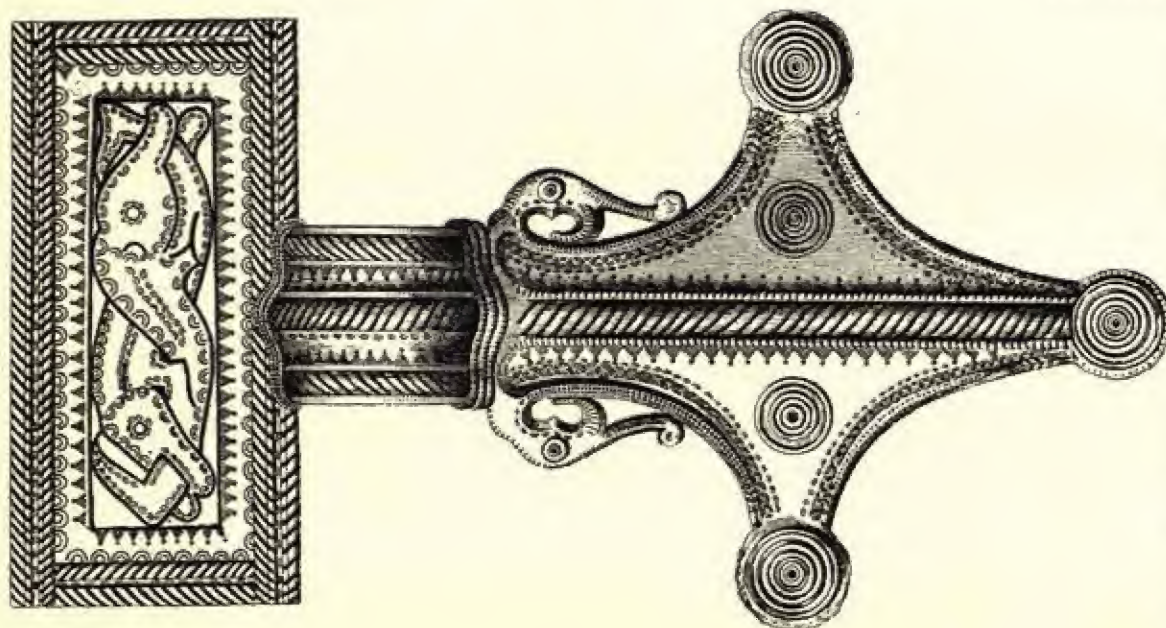


Fig. 21. Silver brooch decorated with dolphins, Norway
By courtesy of the Bergen Museum

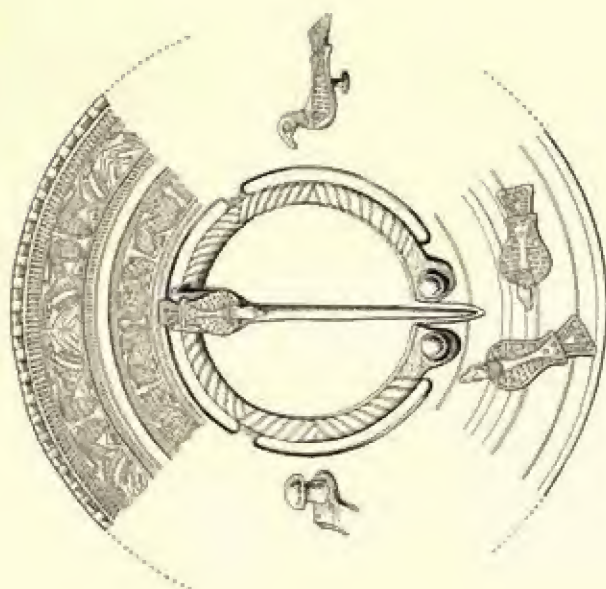


Fig. 19. Silver brooch, Sarre, Kent
From British Museum *Anglo-Saxon Guide*, Fig. 59

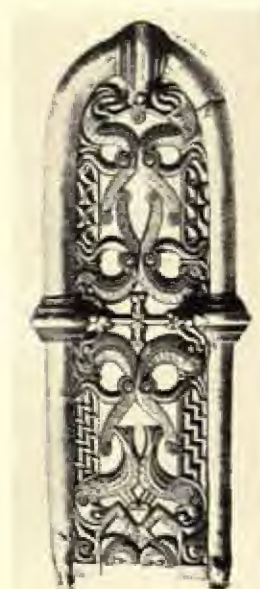
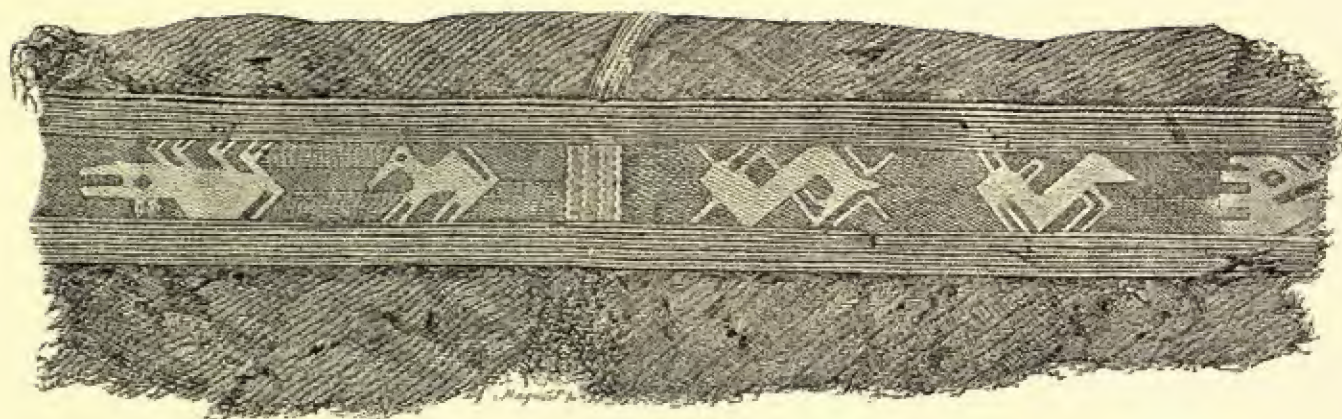


Fig. 20. Silver mounting for a scabbard, Nydam
From *Nordiske Fortidsminder*, 1, Pl. XXX



Fig. 18. Silver brooch, Hol, Norway
By courtesy of Th. Petersen and Trondhjem Museum



Figs. 22 and 23. Fragments of woven ribbon with animal figures, Enebø, Norway
By courtesy of Hans Dedekam and the Bergen Museum

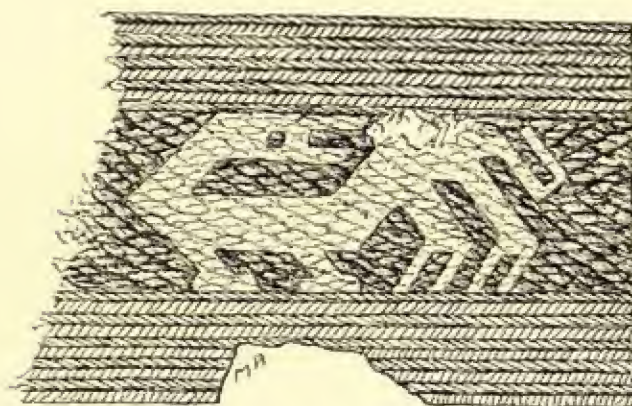


Fig. 24. Fragment of textile, Enebø, Norway
By courtesy of Hans Dedekam and the Bergen Museum

(fig. 16). In spite of debased forms and bad execution, the pieces are no doubt of Roman provincial origin, not Teutonic. The difference is clearly shown by some later additions to the decoration of one of the phalerae, in the shape of small figures of thin pressed silver fastened to the plate with no regard to the original design. The figures represent small quadrupeds, birds, and fishes in extremely conventional form, and are of the highest importance to our subject, as being the very first specimens of independent Teutonic decoration, and at the same time clearly indicating the contrast between classical compositions and early barbarian attempts at ornamental figure-subjects.

In the same class as the Thorsbjerg figures are grouped a series of contemporary Teutonic ornaments with friezes of animals or birds pressed in silver for decorating various objects. The Danish silver cups of Himlingøie (fig. 17) may be cited as well-known examples, and similar compositions come in considerable numbers from Denmark, Sweden, and Norway, from Hanover and England. They belong to the third and fourth centuries, and are intimately connected with influences emanating from the Gothic civilization of South Russia; to some extent they were most likely productions of Gothic industry, imported into the North. They reflect the character of the industrial arts that flourished among the Goths in South Russia, and a very interesting comparison is offered by the Novocherkassk gold collar with its friezes of animals. This Sarmatian jewel might be regarded as the direct model of the corresponding ornament on Danish silver cups and other Teutonic ornaments of the same kind, and the motive thus adopted became a lasting element of the later Migration style.

The motive is specific in spite of its simplicity. The effect is derived from the uniform repetition of an identical figure, which is in itself of no special interest. A composition of this kind seems not to be derived from the old Scythian art, but rather looks like a simplification of classical Greek friezes of animals or monsters, which were equally accessible to Sarmatians and Goths. The Goths may have taken them over from the Sarmatians, or they may have got them direct from some classical models of the kind we have seen from Thorsbjerg. In all cases it ought to be adequately emphasized, as it has not been before, that this kind of ornament is actually the first stage in the evolution of the Teutonic style of ornamentation of the Migration Period. As Dr. Minns has suggested, the Novocherkassk collar ought to be accepted as the clue to one prominent feature of the Migration style, examples of which are the friezes of animals on Scandinavian square-headed brooches of the fifth century (fig. 18), the magnificent round silver brooch of Sarre in Kent (fig. 19) and other specimens illustrated in figs. 38, 58 of the British Museum *Guide to Anglo-Saxon Antiquities*. Similar friezes are seen also on the Danish gold bracteate (fig. 31) of the fifth century, and traces of this

design are still found during the flourishing period of the style in the sixth century.

But the friezes of animals, which are thus derived from South Russia, are only one of several elements that united to form the Teutonic Migration style. During the fifth century Northern art excelled in manifold and varying figures, as seen on the Gallehus drinking-horns, the Swedish gold collars, and on the early bracteates with figure subjects. Another series is formed by different fantastic animal forms of more or less definite description. A fine silver ornament from a Teutonic grave on the Aisne in France bears some well-modelled figures like fishes, but probably meant to be mythical sea monsters.¹ Original and striking decoration is seen on the silver mount of a sword-sheath from Nydam in Slesvig (fig. 20), where pairs of human heads and birds are clearly distinguishable, while other figures are of a less definite character. One might be tempted to compare this last-mentioned ornament with a clasp from Siberia,² which is strikingly like it, though I can see no possible connexion between them.

At the same time the large silver brooches were decorated with dolphins, or hippocamps, or serpents, executed either like drawings of black niello lines on polished silver (fig. 21), or the figures were cast separately and riveted to the brooch. The method last mentioned was the beginning of cast relief decoration, and soon there followed the more accomplished process of casting in one piece the whole brooch with its decorations.

Another possible source for animal motives should be mentioned, though we have very scanty means of estimating the extent of its influence. In some few cases the remains of dresses found in the graves are finished with woven ribbons showing animal patterns in colours. On one of the fragments from Enebø (fig. 23), recently published by Dedekam, we see birds and pairs of lions alternating in small compartments. The symmetrical arrangement points to a probable model of Greek or Oriental origin, though the piece itself seems to be surely home-spun Norwegian. A small bit of a ribbon from Snartmo (fig. 25) is of purely native character and so are the other fragments from Enebø (figs. 22, 24). Though few specimens are preserved, textiles of this kind were apparently rather common, and show that the animal motives in many different forms were familiar to the Northern peoples towards the end of the fifth century.

We may refer here, also, to some slight and careless drawings, more like casual graffiti than decoration in the proper sense of the word. The figures of a horse and a dog appear slightly engraved on the plain silver back of a

¹ Boulanger, *Le Mobilier Funéraire Gallo-Romain et Franc en Picardie et en Artois* (Paris, 1902-5), pl. xix, fig. 7.

² Ellis H. Minns, *Scythians and Greeks*, p. 274, fig. 193.



Fig. 25. Fragment of textile with animal figure, Snartmo, Norway
By courtesy of Hans Dedekam and the Bergen Museum



Fig. 27. Silver brooch with chip-carving decoration, Norway
By courtesy of Instituttet for sammenlignende Kultur, Oslo



Fig. 28. Roman girdle mountings
From Suderberg, *Antikvarisk Tidskrift för Sverige*, xi, figs. 6-10



Fig. 29. Gold medal of Constantius II, Denmark
From Brøgger, *Ertog og Øre*, Pl. I, fig. 2



Fig. 30. *a, b, c.* Barbarian gold medals, Norway
From Brøgger, *Ertog og Øre*, Pl. I, fig. 4, and Pl. II, figs. 3 and 4



Fig. 31. Gold Bracteate, Denmark
From S. Müller, *Ordning af Danmarks Oldsager*, ii, fig. 554

square-headed brooch.¹ The figures look as if drawn from life, not from the conventional forms of contemporary art. On the other hand, the two figures scratched on the small panels of a wooden object (fig. 26) are extremely schematized, without the slightest resemblance to any living creature. Such examples are of no small interest, as they reveal what forms were accessible to the idle draughtsman, playing with lines on a blank surface.

The different elements of ornamentation, hitherto reviewed, lead up to the latter half of the fifth century. Up to this time Teutonic art had included a

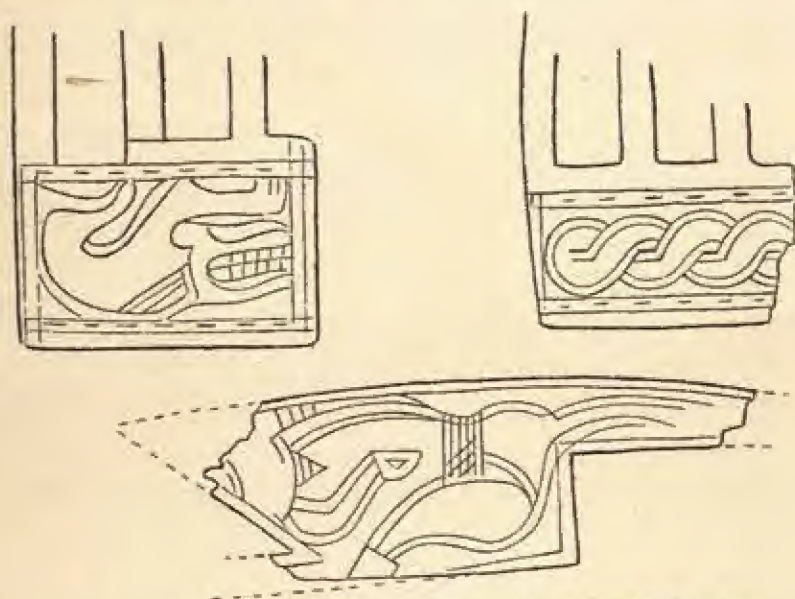


Fig. 26. Ornamental designs on wooden object, Enebø, Norway.

variety of subjects, some of them borrowed from the local South Russian industry, others from classical models, others again of doubtful origin or perhaps of truly Teutonic invention. This early period of Teutonic decoration has not generally been counted as belonging to the Migration style, and certainly the style had not yet assumed its peculiar and constant character. The Scandinavian archaeologists who have treated this question have always made a clear distinction between the various early ornaments of the fourth and fifth centuries and what may be called in a stricter sense the Teutonic style of the Migration period. Sophus Müller will admit of no connexion at all between these two stages, and even Salin starts his 'Style I' with the chip-carving work of the latter half of the fifth century. At this moment certain fresh elements were introduced that became fundamental to the later evolution; and for this reason

¹ *Foreningen til norske Fortidsmindesmerkers Bevaring: Aarsberetning, 1900, p. 299, figs. 10 and 11.*

Scandinavian students almost unanimously have looked to Roman provincial metal-work for the models that inspired Teutonic art.

Chip-carving decoration is common to the Roman provinces and the Teutonic peoples during the fifth century. The priority must be ceded to the Romans, and the chip-carving technique is put down as one important element borrowed by the Teutons from classical industry. Various patterns such as squares and stars and spirals were in high favour in all the Teutonic countries from Hungary to England and Norway (fig. 27), and as corresponding Roman models were to be found everywhere in the frontier districts, it is difficult to say exactly from what quarter this style was originally borrowed. Most likely it was adopted independently in different places. Chip-carving is regularly combined with animal motives, the zoomorphic designs being confined to special compartments or arranged as friezes along the borders. It has often been believed that the animals here were derived from the same source as chip-carving, viz. from contemporary Roman models; but evidently in most cases this is not so, as the friezes of small crouching animals, the broad circular masks, human faces seen in profile, and other figures too, had been already absorbed into Teutonic art through Gothic influence in the third and fourth centuries. But during the fifth century some new forms were introduced and became of decisive importance for the final evolution of the style.

At this stage the Teutonic art appropriated, not only single figures, but certain complete compositions of Roman metal-work, such as buckles, girdle-mounts, and similar small objects. An imitation of this kind is seen in the equal-armed brooches of Hanover and England; and Söderberg was the first to show that the later evolution of square-headed brooches is directed by certain Roman forms of girdle-mounts (fig. 28); the whole composition is exactly repeated, and has been in Scandinavia the principal argument for deriving the Migration style from classical models. The examples cited were found mostly in France and Belgium, thus supporting the conclusion that the style primarily originated among the Western Teutonic tribes around the North Sea. But the examples adduced by Söderberg and Salin are too specific to explain all the different elements comprised in the Teutonic Migration style; they are illustrative of the same general feature already inferred from the distribution of the chip-carving technique, viz. that Teutonic metal-workers were at this time in close touch with a debased Roman industry, in all places where barbarians had established themselves within the frontiers of the provinces. We are not concerned in the discussion whether the decoration consisting of symmetrically arranged animal-figures may be traced back to oriental principles; the motive entered Teutonic art not from the East, but from current classical patterns which had been for long ages familiar to the Greeks and the Romans.

The importance of intercourse on the Rhine frontier is clearly shown by another series of Scandinavian works in metal forming an instructive parallel to the decoration on personal ornaments. The gold bracteates of the North are universally known to be derived from Roman gold coins of the late fourth century. The large coins worn as medals and the barbaric imitations of them, which have been found in Denmark and Norway (figs. 29, 30), all belong to a short and definite period, evidently corresponding to the interval of peace on the Rhine frontier about A. D. 360-370. The conclusion is corroborated by a good part of the coins being struck in western provinces, especially in Trier. We have here a piece of evidence that a purely Scandinavian type of ornament was due to influences from the western part of the Empire. It is not unlikely that other elements of Roman metal-work, such as certain animal-motives which we have seen were incorporated in the Teutonic style during the fifth century, were also received from Gaul or Belgium. The evolution of the bracteates is too well known to detain us here; I need only remark that the gradual transformation of the coin designs is in a high degree illustrative of Teutonic taste and workmanship, but the changes of the original Roman images were not purely formal. To a great extent the Roman figures were interpreted as representing subjects from Northern myth or religion, and were worked out according to this new significance (fig. 31).

Towards the end of the fifth century the Teutonic style had acquired all the essential elements that became characteristic of the flourishing period next to follow. We have seen already some typical examples of these overcrowded and fantastic decorations, and the last stage in the evolution of the style was due entirely to native development in Scandinavia and in England. All Roman influences were excluded after the devastation and dismemberment of the Western Empire, and the possible connexions with South Russia had ceased, at all events, with the Gothic emigration. Thus, in its final form, the Migration style is profoundly original, and so far justifies Sophus Müller in describing this group of decorative art as a thoroughly independent creation of the Teutonic genius. Certainly the details were borrowed from foreign sources, some of them by the Goths during the time they were established in South Russia, others from the industrial arts in different parts of the Roman Empire.

The views proposed by Ellis Minns and by Reginald A. Smith are thus, perhaps, a little too much of a simplification of the problem. In tracing in detail what actually took place in the progress of the style, we can distinguish the successive introduction of motives and the adoption of new techniques. The use of coloured stones was quite secondary in the North, where the animal-ornaments were most richly developed; and some special motives, which have been mentioned as Scythian, e. g. the boar's head, the bird's head with a strongly

curved beak, are not very prominent in the style of the sixth century. A bird's head of this description, carved in wood, was among the objects discovered in Vimose, a discovery defined as a moss deposit of the third century A.D.; but it is doubted whether the bird's head is of the same age. Mr. Smith has referred to the terminal heads on the Taplow drinking-horns. In the North this head might as well be derived from classical models, as shown by a Roman specimen found in Denmark.¹ At least, it is certain that such heads did not become a favourite Teutonic motive on the Continent till the beginning of the seventh century.

The early style of the fifth and sixth centuries has no special predilection for birds of prey; it prefers broad decorative masks, and curious human forms; above all, quadrupeds of a peculiar and clumsy shape, but treated with great variety of design and position. The elements of the style had different sources, but as a whole it was markedly homogeneous and original; it was truly created by the stirring history of these centuries, by the Teutonic invasions of every part of the Continent, and by the reflex movements towards the northern and north-western countries.

¹ C. Engelhardt, *Fynske Mosefund no. II, Vimose Fundet* (Kjøbenhavn, 1869), pl. iv, 1.

DISCUSSION

Mr. MINNS took no credit for any use that had been made of the Russian material in his own book, and had not himself developed the connexion with Teutonic ornament. His own impression had been that the Migration style was marked by garnet inlay rather than disjointed animal forms, but he saw there were other elements to be considered. Tides of artistic faculty had come out of Iran in succession—Assyrian, Scythian, Sarmatian, and Sassanian—and brought certain methods of treating animal forms. The Goths had been thus affected in South Russia, and began to produce birds with pronounced beaks and jewellery of bright colours, eventually communicating their tastes to other Teutonic peoples. In South Russia violent contrasts were preferred, and though the chip-carving motive (*Keilschnitt*) was found there, the section was not of V-form like the Teutonic. The Jutish people had much in common with South Russia, but the Angles and South Saxons had little to do with that style, which on the other hand was of great importance in Merovingian art. The Teutonic work shown on the screen did not seem to be strongly influenced by South Russia, and he agreed with the author's view that the Teutonic art was largely independent and creative. His own view was that the Migration style was not that of the tribes who stayed at home, but of those who migrated to South Russia.

Mr. LEEDS hesitated to add anything to Dr. Shetelig's very full treatment of the subject, but agreed that there was very little South Russian to be traced in the northern sphere, where the stag ornament, for instance, must have been known independently. Most of the elements illustrated in the paper had undoubtedly been derived from the western frontier of the Roman world.

Mr. REGINALD SMITH said the Migration style was only the first chapter of a long story which had been splendidly published by Dr. Shetelig in the third volume on the Oseberg ship, a copy of which was in the Society's library. It was curious that the Goths, who came into contact with Scythian culture, should have left behind in Europe less of the animal motive than other branches of the Teutonic stock. There could, however, be little doubt that the bird with hooked beak, and the garnet cell-work in which it was often represented, both came from South Russia, where Professor Rostovtzeff had insisted on the Sarmatian preference for bright colours, and Mr. Dalton had long ago traced the *cloisonné* technique to its oriental home. The 'chip-carving' method of producing the play of light and shade on a flat surface had been dealt with by the late Professor Riegl, and its distribution in England made an interesting story. A fine example was shown from Nydam Moss in Denmark (fourth century A. D.), and there was a good deal in Belgium towards the close of the western Roman Empire; but he was not satisfied that the Romans themselves were responsible for it; and the association with animals in profile on the edge of buckle-plates so ornamented (as illustrated by Söderberg) suggested some connexion with the crouching animals in relief on certain bronzes from South Russia. Dr. Shetelig had not only come a long way for the purpose, but had addressed the meeting in English on a subject of great complexity and importance, in which both Norway and England were very fittingly concerned.

The CHAIRMAN (Professor Myres) thanked the author in the name of the Society for a most instructive paper. It was a pleasure and privilege to meet an honorary Fellow whose work was so well known to students of Anglo-Saxon archaeology in Britain. The question under discussion was one on which archaeologists would continue the debate indefinitely. It was a problem of diffusion which could be approached from many sides, and the available material was not at present sufficient to provide a final solution. Every specimen in metal or fabric was an original work whereby the artist strove to express his own feelings and to surpass his fellows;

an interplay of tradition and invention which challenged explanation, and had been variously explained. Recently there was the 'Sarmatian' or 'North Iranian' theory of Professor Rostovtzeff; on the other hand, in the posthumous edition of Professor Hoernes' *Urgeschichte der bildenden Kunst* which just touched on the 'disjointed' style of Teutonic ornament, there was still the older suggestion of a continuous tradition of naturalism and 'animal-style' in central Europe, interrupted from time to time, but reasserting itself as the cause of disturbances faded out. In dealing with the Teutonic world one had to make allowance for influences from the south-east, south-south-east, and due south, possibly also an older influence from the south-west, the Massilia of the Greeks. In some of Dr. Shetelig's examples the La Tène handling of curves could be recognized, and even Hallstatt elements could be detected in the modern products of Norway: a collection of Norwegian silver ornaments he had seen was a répertoire of European culture.

VI—*Some Rock-cut Tombs and Habitation Caves in Mallorca.*

By W. J. HEMP, Esq., F.S.A.

Read 18th March 1926

It has been claimed that in its general form the type of burial cave which is the principal subject of this paper is in some way linked with the long-barrows of Britain; that is to say they must have had a common origin, and both must have been built by people dominated by some very powerful tradition—the cult of the dead. So far as western Europe is concerned, it is here assumed that the original home of this cult, or at any rate of many of its attributes, is to be sought for in or around the eastern Mediterranean, and that a great deal, if not all, of its influence reached Britain by way of Spain, or by the more direct route on which lie the Arles group of caves and those of the Marne. Therefore, in view of the central position of the Balearic Islands in the western basin of the Mediterranean, there is at least a possibility that the monuments of megalithic type to be found in them may bear a definite, even if remote, relation to those of Britain.

The main features of the megalithic monuments in Britain, as elsewhere, have been recorded, compared, and contrasted over and over again, but the small details in almost all cases have perished unnoticed, having been destroyed by natural causes, or through the incompetence or indifference of the excavators. It is, therefore, the rock-cut tombs, where the chances of survival are so much greater, that are most likely to supply the additional evidence so badly needed.

When visiting a number of the artificial caves in Mallorca, Mr. O. G. S. Crawford, F.S.A., and the present writer were much impressed by the clear traces of forecourts in many instances. One cave in the valley of San Vicente had been well known for many years past, thanks to the writings of the late Professor Émile Cartailhac and the diagrams published by him in *Les Âges préhistoriques de l'Espagne et du Portugal* (p. 140) and, in a more complete form (fig. 2), in *Les Monuments primitifs des Îles Baléares* (p. 47); while this last was reproduced by Capt. Déchelette in the *Manuel d'Archéologie Préhistorique* (vol. i, p. 420). Although these diagrams served M. Cartailhac's purpose, in

neither case were they accurate, and the greater volume of evidence now available for dating this San Vicente cave and comparing it with similar monuments in Mallorca and elsewhere seemed to justify the publication of a more complete and accurate description. Moreover, M. Cartailhac recorded his inability to find any evidence for assigning it to a definite period. As, therefore, this cave already had a place in prehistoric archaeology, and promised fair

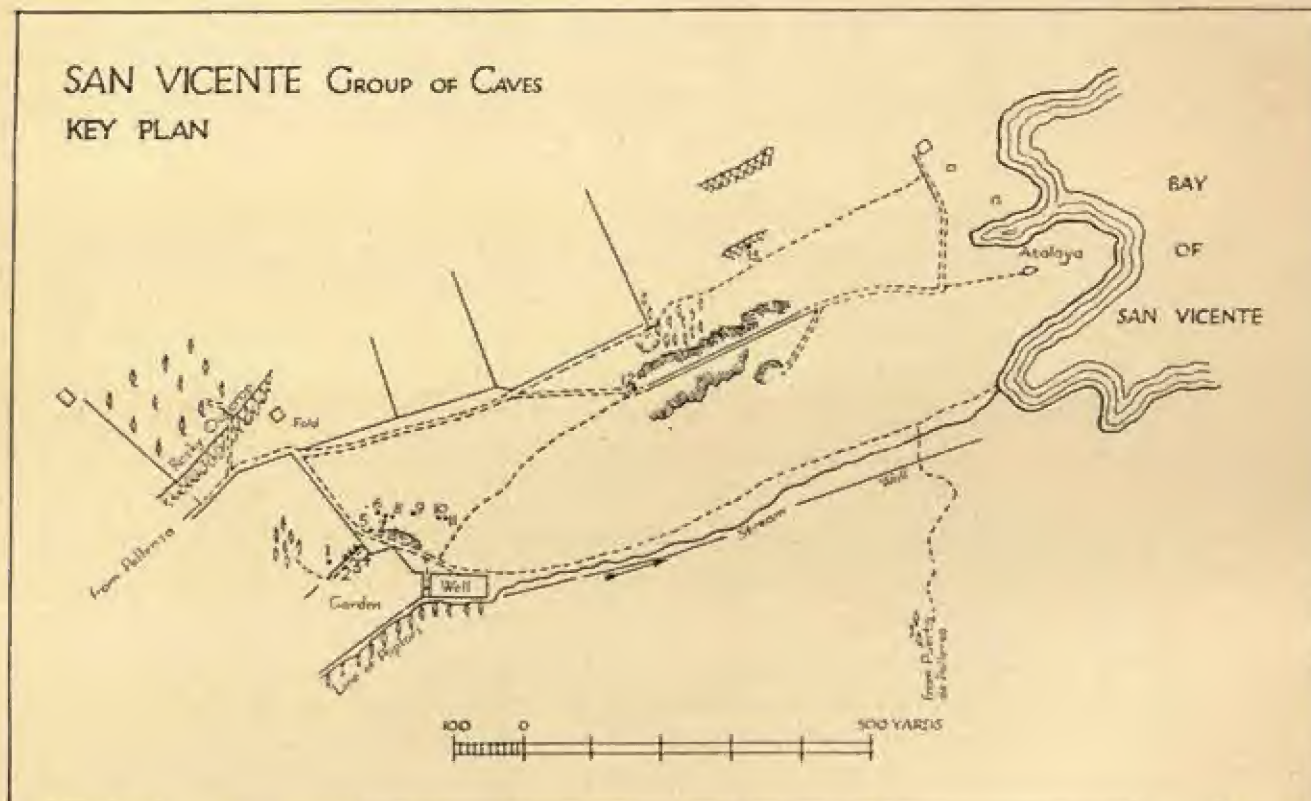


Fig. 1. Plan of the San Vicente group of caves.

results in the limited time available, Mr. Crawford spent some time in January 1925 in making a fresh survey and plan of the chambers, and shortly afterwards, the forecourt having been cleared of accumulations of soil and vegetation, the plan of the whole monument was completed.¹ In January 1926 the opportunity occurred for further investigations in Mallorca, and Lieut.-Col. C. D. Drew, D.S.O., planned several other caves.

The San Vicente group lies in a valley in the north-eastern extremity of the island, three miles from the town of Pollensa. The caves are 100 ft. or so above

¹ Permission to carry out the work was willingly accorded by the owner of the land, Don Bartolome Aloy of Pollensa, and all difficulties were removed by the kind help of Colonel Rafael de Ysasi y Ransome of Palma.



Fig. 1. Cave no. 7: forecourt looking east. The figure stands in the forecourt of no. 8



Fig. 2. General view showing positions of caves nos. 3-11



Fig. 1. Cave no. 7: forecourt and entrance



Fig 2. Cave no. 7: north-east corner of forecourt

sea-level, and are placed along the southern slope, and, in the majority of cases, at a short distance below the crest of a low ridge of soft limestone rock known as L'Alsinar which occupies the bottom of the main valley running approximately north-east and south-west (fig. 1 and pl. xvii, fig. 2). Half a mile from the main group of caves the ridge ends at a small bay, the Cala San Vicente, while the mountainous sides of the valley, some 1,700 ft. high on the north, and 1,000 ft. on the south, continue as rocky promontories and enclose the bay, that on the south forming a magnificent precipice rising sheer from the water to a height of just under 1,200 ft. At the southern foot of the ridge just below the caves is the stream which rises at the spring of Can Martorellet and drains the main valley; dry weather soon stops its flow, but in winter the water remains in the pools for several days after it has ceased to run. The horizontal strata of the rock, a somewhat loosely cemented calcareous sandstone, follow closely the contours of the ridge, so that after cutting out a 'shelf' in the slope it was a simple matter for the diggers of the caves to excavate back into the easily worked rock of the hill, leaving a crust to form the roof of the cave, while the 'shelf' formed a platform in front of it.

This San Vicente group contains two sharply defined types of cave which may be labelled as burial and habitation respectively. The habitation caves vary in detail, but the usual plan is a large roughly circular chamber, with a domed roof descending at the doorway to such a level as would allow of easy entrance; often there is a step down from the threshold into the cave, and at one side of the interior a raised platform; while in some instances there is definite evidence of a forecourt.

The burial caves also vary considerably, but all consist of a long main chamber, usually with one or more smaller side-chambers opening out of it. Those placed on level ground are approached by means of a descending stair contained in a chamber cut in the rock and now open to the sky. Others possess an underground vestibule entered from an open forecourt, the latter being in many cases quite small.

For ease of reference the San Vicente caves have been numbered in order from west to east, but it will be convenient to describe first the one for which the most complete evidence is available, namely the Cartailhac cave, no. 7. This is the centre one of a series of three which immediately adjoin one another and occupy the highest position on the ridge (fig. 3). They are orientated approximately north and south and are distinguished from the rest of the group by the large size and rectangular plan of their forecourts, which are, or were, separated from each other by narrow walls of rock left standing when the courts were first excavated.

Cave 7.

The forecourt of cave no. 7 is the largest of the three; it is 20 ft. in length from north to south, and varies from 18 ft. to $16\frac{1}{2}$ ft. in width. The southern boundary is not now clearly defined, but it was almost certainly limited by the natural fall of the rock along the line suggested by the plan (pl. xix). The central area is badly eroded in places, and some of these are indicated, as it is just possible that the cavities may mark the position of artificial sinkings which have lost all their original features; it is, however, much more probable that they are entirely natural.

The greater part of the northern, eastern, and western sides is surrounded by a step or bench about 1 ft. 9 in. wide, and from 6 in. to 9 in. high (pl. xvii, fig. 1, and pl. xviii, figs. 1 and 2); on the northern side, however, the step is recessed for an additional 7 in. in width for a space of 4 ft. 10 in. in front of the entrance, and within this wider area lies the threshold, which is from 2 to 3 in. lower than the step. A semicircular sinking in the middle of the edge of the threshold may have some significance, or may be entirely natural. The southern corners of the threshold have been rounded with considerable care, although it would have been much simpler to have cut them square, and the north-western angle of the courtyard itself shows this same rounding, which is a marked characteristic of the external features of these monuments.

The eastern step is unbroken, but the western is interrupted by a boss of rock which projects slightly into the area of the courtyard, and rises to a height of 3 in. to 4 in. above the general level of the step; in it is sunk a socket or hole 6 in. deep and approximately 9 in. square. It is not possible at present to suggest the purpose of this, unless it was intended to hold an altar.¹ The rock is well preserved in the corresponding position on the eastern side of the courtyard, and it is quite certain that no similar hole existed there, otherwise it might have been a socket for an upright to carry a timber roof. A similar feature occurs in connexion with two other caves at San Vicente (nos. 9 and 11). The rock surface north and south of the boss is somewhat weathered, and the actual lines marking the end of the step have disappeared, but there is very little doubt that they formerly existed as shown by the dotted lines on the plan.

A shelf has been cut back in the rock face above the entrance, 7 ft. above the level of the forecourt; this probably extended for the whole width of the forecourt, but the rock above and to the west of the entrance has entirely weathered away, so that only the eastern section of the shelf now remains (pls. xviii, xix). This shelf is a curious feature, paralleled in at least one other

¹ See p. 141.

San Vicente cave (no. 9), and at the Grotte des Fées near Arles. Here again rounded corners are a noticeable feature.

In the present instance three grooves, two running east and west, not exactly in line, and divided by a fault in the stone, and a short one running north and south, may be connected with some system of roofing the forecourt in comparatively recent times.

The lower part of the rock face on the eastern side of the entrance is badly eroded, and this erosion extends round the north-eastern corner to the eastern

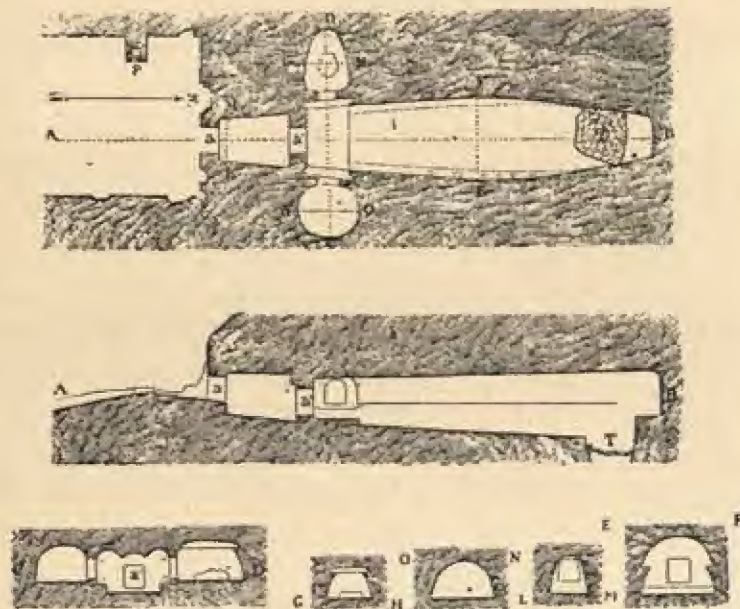


Fig. 2. Cave no. 7.
From Cartailhac, *Les Monuments primitifs des Îles Baléares*, fig. 35.

boundary wall of the courtyard; while a niche in the northern face on the west side of the entrance, and another small one at the north end of the western boundary wall are also probably due to natural agencies. The entrance was originally surrounded by a rebate about 3 in. wide and 2 in. to 3 in. deep, but the greater part of it has weathered away: it becomes merged into the general face of the rock at the points where it meets the threshold, and is therefore not shown in the plan.

Access to the cave itself is through a short passage 1 ft. 9 in. long, 2 ft. 3 in. high, and 1 ft. 9 in. wide. The passage slopes slightly down and leads directly into the 'vestibule' or 'antecella', which is 6 ft. 3 in. long; 4 ft. wide at the entrance, increasing to 4 ft. 6 in., and 3 ft. 6 in. high. At the inner end of the vestibule is a second short passage, similar to the first, which leads into the main chamber. Immediately in front of the entrance to this second passage a slightly curving groove 6 in. to 10 in. wide has been cut in the floor of the vestibule and

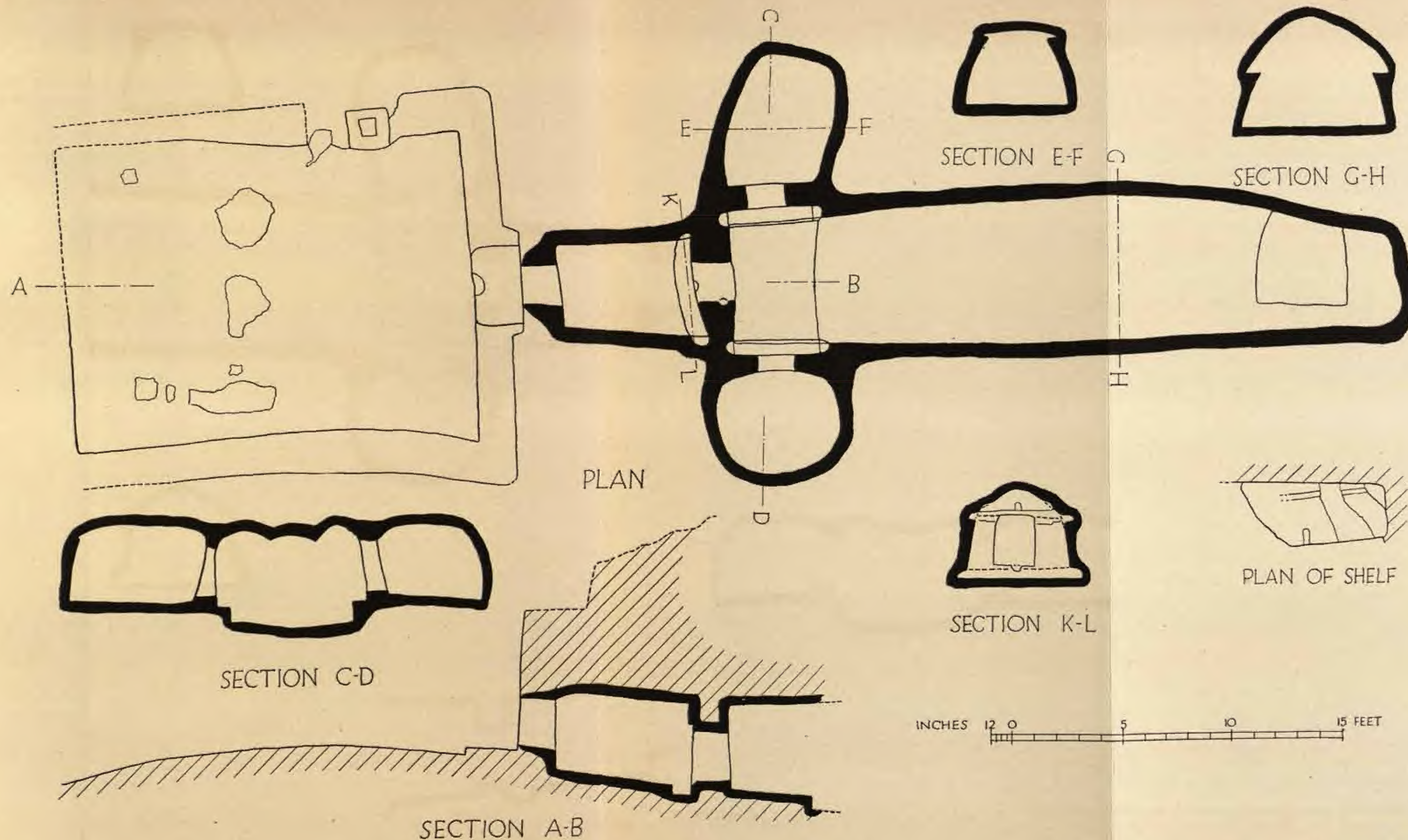
extends into the walls on either side. Above this entrance is a tympanum which projects 2 in. A double groove crosses the wall-face immediately underneath this, and is continued on either side by pockets in the walls. It is clear that the trench and groove were intended to contain timbers, the only purpose of which could have been to hold in position some form of door closing the passage. Moreover, two sockets projecting a short way into the roof and sinkings approximately in the centre of the tympanum and threshold, mark the position of three perpendicular timbers which must have reinforced the horizontal ones.

On the right-hand side of the second passage is a groove, semicircular in section, and about 6 in. wide and 3 in. deep running from roof to floor; it is continued below the floor-level for about 9 in. as a roughly circular socket, and upwards by a recess 3 in. deep. As the rock contains many holes and crevices (so much so that in places it resembles a sponge), it is conceivable that groove and sockets are natural, but they have every appearance of having been artificially made, except that there are no tool marks; these, however, cannot be detected in any part of this cave, or, indeed, of any of those described in this paper except in places where they seem to indicate modern work.

The main chamber is about 5 ft. 6 in. wide at the southern end; and at 4 ft. from the entrance there is a step down, which is at least a foot deep. From this point, however, up to within 12 ft. from the end, the cave floor is covered by earth up to the level of the top of the step. Until this earth (which contains many stones and bones) can be removed, a complete examination is impossible, and for 20 ft. northwards the plan here given records the position of the cave walls at the level of the top of this filling. It is, however, probable that the result is practically what it would have been, could the actual floor of the cave have been plotted.

Between the entrance and the step are openings on either side leading into small side-chambers. These openings closely resemble that leading from the vestibule to the main chamber, and have the same provision for two horizontal and three perpendicular timbers closing the entrances. A 'barrel vault' is worked in the roof of the main chamber opposite each opening. The eastern chamber is roughly circular; the western is an irregular oblong with rounded corners. The wall dividing the western side-chamber from the main chamber is pierced by a small hole close to the upper left-hand corner of the opening. This hole appears to be natural. Immediately under the roof of the western chamber is a ledge some 4 in. to 6 in. wide similar to those in the main chamber described below. Inside lies a stone which may have been employed to close the entrance.

Running northwards from the step there is on each side of the cave a ledge 9 in. wide projecting from the wall about 2 ft. 6 in. above the present level of



CAVE NO. 7: PLAN AND SECTIONS

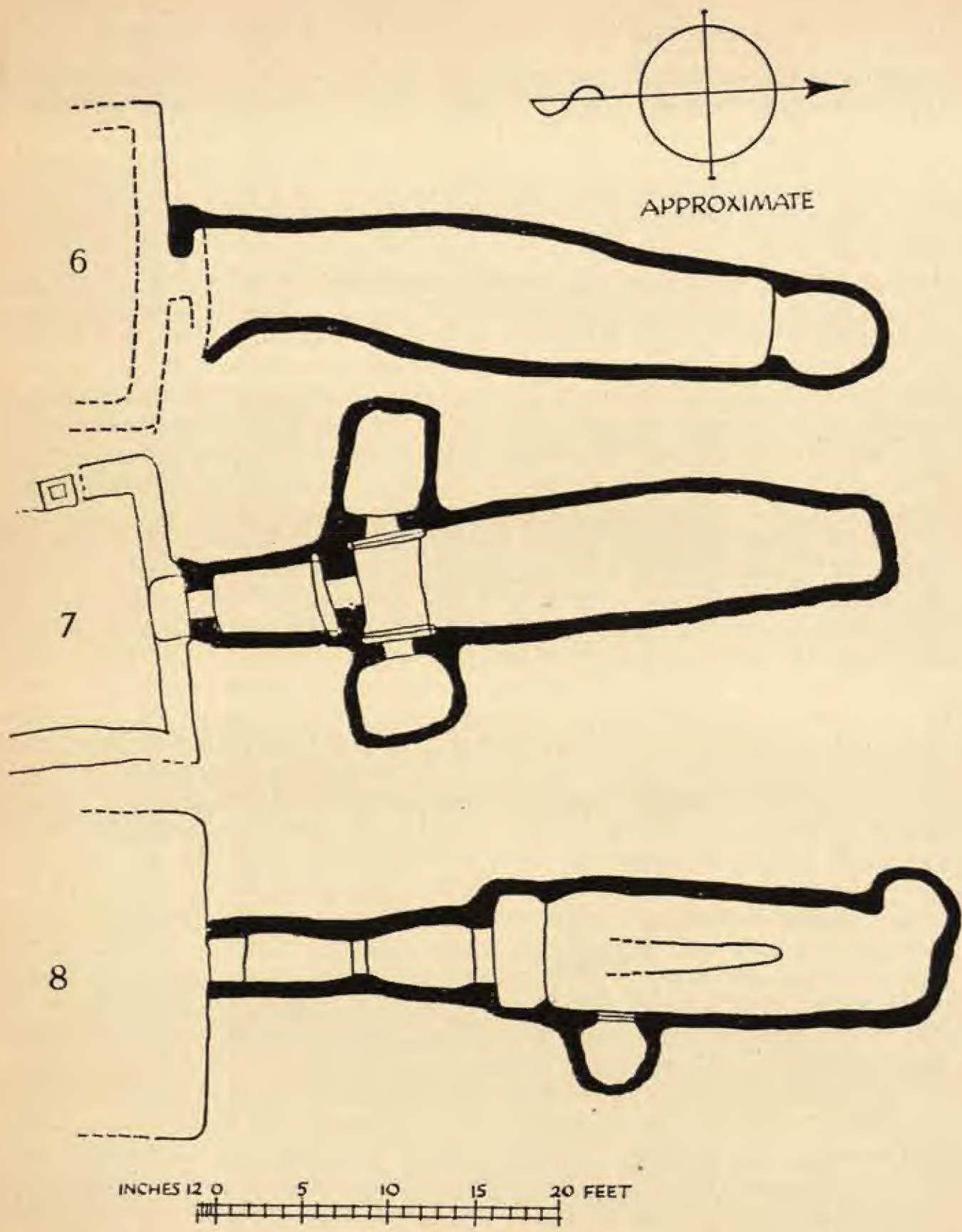


Fig. 3. Plan of caves nos. 6, 7, and 8.

the filling. These ledges run for a distance of 24 ft. and then die away into the side walls between 3 ft. and 4 ft. from the end of the cave (fig. 2). Similar ledges are found in cave no. 12; their purpose is obscure, but in this case (no. 7) there is cut on them a series of 'cups', i.e. circular depressions like shallow saucers, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch deep, and varying in diameter from 3 in. to $5\frac{1}{2}$ in., and with these are 'rings' from 7 in. to 8 in. in diameter. The 'rings' are penannular, the ends being slightly enlarged and the openings usually towards the east. At one place is an incomplete ring, and this figure may recur, but the eroded state of the rock makes it impossible to be certain of more than one instance.

On the western ledge the only definite mark is one ring, at 9 ft. 4 in. from the north end; some doubtful markings which immediately adjoin it are probably natural. It is impossible to state the total number of either cups or rings originally cut upon the eastern side, as the rock is badly holed and pitted towards the southern end; but about a dozen cups can be traced with certainty. They are arranged in the following order, the measurements being from the northern end of the ledge and taken to the centre of each mark:

At 6 ft. 3 in. is a deeply cut ring. At 6 ft. 11 in. a doubtful ring. At 7 ft. 9 in. a cup 5 in. in diameter. At 8 ft. 5 in. a cup 4 in. in diameter. At 9 ft. a cup 4 in. in diameter. At 9 ft. 9 in. a portion of a ring having a small opening to the west, the eastern part being not completed. At 10 ft. 2 in. is a cup 4 in. in diameter. At 11 ft. 3 in. one of $5\frac{1}{2}$ in., and at 11 ft. 7 in. one of $4\frac{1}{2}$ in. At 12 ft. 6 in. is an incomplete ring, or one that has been damaged by erosion. At 13 ft. 9 in. is a 3 in. cup, followed by one of the same dimensions at 14 ft. 4 in. At 14 ft. 11 in. is one of 4 in., and at 15 ft. 8 in. another of the same size. At 16 ft. 3 in. one of 3 in., and at 16 ft. 10 in. there may be another of the same diameter, but this is not certain, as the rock from this point onwards is badly eroded. Some of the small cups enumerated above must be regarded as doubtful and the series may have been continued farther southwards.

Some of the markings are illustrated (fig. 4). It is possible, but by no means certain, that these are analogous to the cups and rings often found on megalithic monuments. One symbol, however, which occurs in association with typical cups as well as other markings on one of the cover stones of La Grotte de la Source near Arles,¹ bears a considerable resemblance to these at San Vicente,² but the Arles symbol is more open, and the enlarged ends are formed by separately worked pits in the rock.

Speculation as to the meaning of such signs as these is perhaps idle, but it is possible that these San Vicente 'saucers' were intended to contain funeral offerings, and this suggestion is borne out by a discovery in another of the

¹ See p. 158. L. A. Constans, *Arles antique*, p. 8, pl. 1, fig. 5 (a very inaccurate record).

² Cf. also the marks on the dolmen de Mané-Lud at Locmariaquer.

allées couvertes near Arles. In the floor of La Grotte Arnaud is a series of six circular holes about 10 in. in diameter placed symmetrically close to the walls of the chamber, three on either side, and in one of these was found a quantity of beads, sufficient to have formed a bracelet or collar.¹

The pottery vessels found in certain megalithic burial chambers in the Channel Islands and Brittany may also be analogous. A group recently found

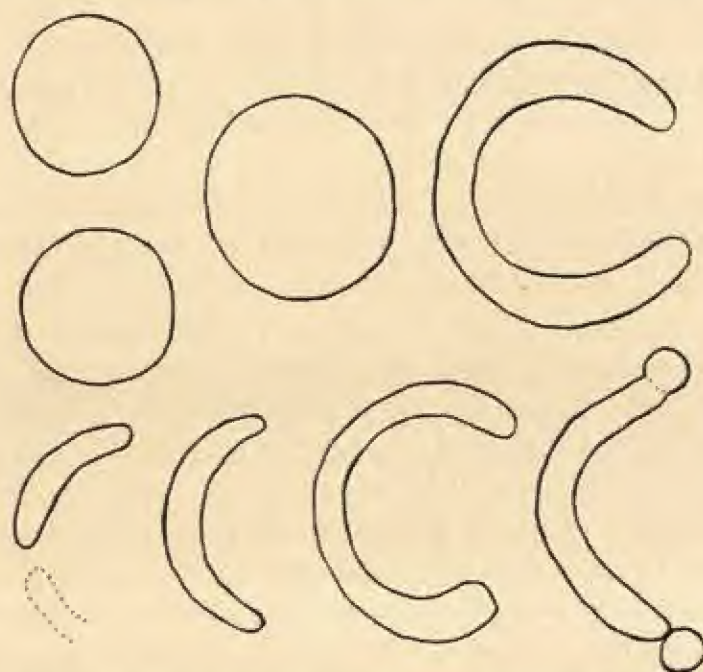


Fig. 4. Cups and rings: all from Cave no. 7 except bottom right which is from La Grotte de la Source, Arles. (†).

in a newly explored monument at La Hougue Bie in Jersey is illustrated in the *Bulletin Annuel* of the Société Jersiaise for 1925, where also is a list of similar discoveries. The vessels from La Hougue Bie are shallow saucers, averaging 6 in. across and about $\frac{1}{4}$ in. deep, on high hollow pedestals, the total height being about 3 in. They may have held offerings, but the fact that they showed signs of burning suggests use as lamps.

From the point where the ledges die away at the northern end the cave is slightly widened, although not to such an extent that there can be said to be a separate terminal chamber. It is, however, possible that this widening is due to the memory of the single dolmen chamber with its passage, from which, according to one theory, these cave tombs may be ultimately derived. Near the

¹ P. Cazalis de Fondouce, *Allées couvertes de la Provence (Second Mémoire)*, 1878, p. 13: 'Dans un de ces trous a été trouvée une quantité assez considérable de rondelles de pierre ollaire, suffisante pour avoir pu constituer à elle seule un bracelet ou même un collier.' M. de Fondouce speaks of five holes only, but there are actually six.

end of the chamber a hole about 4 ft. square has been excavated in the floor; this is certainly of later date than the construction of the cave, and marks of the tool with which it has been cut are clearly to be seen.

No attempt was made to remove any of the contents of the cave, except the earth which filled the groove in the floor before the inner entrance; but there was found on the surface close to the step a conical button of bone, having the typical V-shaped perforation, $\frac{2.3}{3.2}$ of an inch in diameter and $\frac{3}{8}$ in. high (fig. 5). The button has a rounded rim, and is encircled by two grooves. This decoration is unusual; but the type is a common one and characteristic of the Aeneolithic period in Western and Central Europe. M. Cartailhac illustrates a plain conical example from the *allée couverte* of Monte Abraão in Portugal;¹ and the prismatic form, which is most common in Catalonia, is to be seen on p. 50, fig. 14 and pl. xii of *La Civilización Megalítica Catalana y la Cultura Pirenaica* (Barcelona 1925) by Dr. Luis Pericot y García. See also p. 88 of that publication for references to the distribution of the button in France, Spain, Portugal, Italy,



Fig. 5. Button from Cave no. 7.

Austria. Discoveries of similar objects in Greece, Sardinia, Moravia, the south-east corner of the Baltic, and the Scandinavian passage-graves are recorded by Mr. Gordon Childe in *The Dawn of European Civilization*, and reference is made below to the finding of two similar buttons in Mallorcan caves and in La Grotte Bounias near Arles. The San Vicente specimen is now in the Diocesan Museum at Palma.

As it seemed likely that some of the soil which covered the forecourt might have been removed from the interior of the cave, a considerable proportion of it was passed through a sieve, the result being the recovery of many fragments of pottery. Comparison of these fragments with a series of more than eighty complete vessels recently obtained by Professor Francisco de S. Aguiló y Forteza and Señor Andres Crespi y Salom of the Collegio Cervantes, Palma de Mallorca, from a newly discovered and untouched burial cave of somewhat similar type at Son Mulet, Lluchmajor, Mallorca, proved that the pottery from the two caves was practically identical in form and material; while the Son Mulet vessels resemble very closely the pottery found in another Lluchmajor cave, the Cova de ca s'Hereu. This latter cave, which was of irregular shape, was excavated by Señor J. Colominas Roca of the Institut d'Estudis Catalans, and the results were published in vol. vi of the *Anuari* of the Institut for 1920. The pottery is illustrated on p. 559, fig. 263.

Professor Aguiló and Señor Crespi have not yet published the results of

¹ *Âges préhist.*, p. 178.

their important exploration, but they have very kindly authorized the following brief reference to some of them. The Son Mulet cave (now destroyed) con-

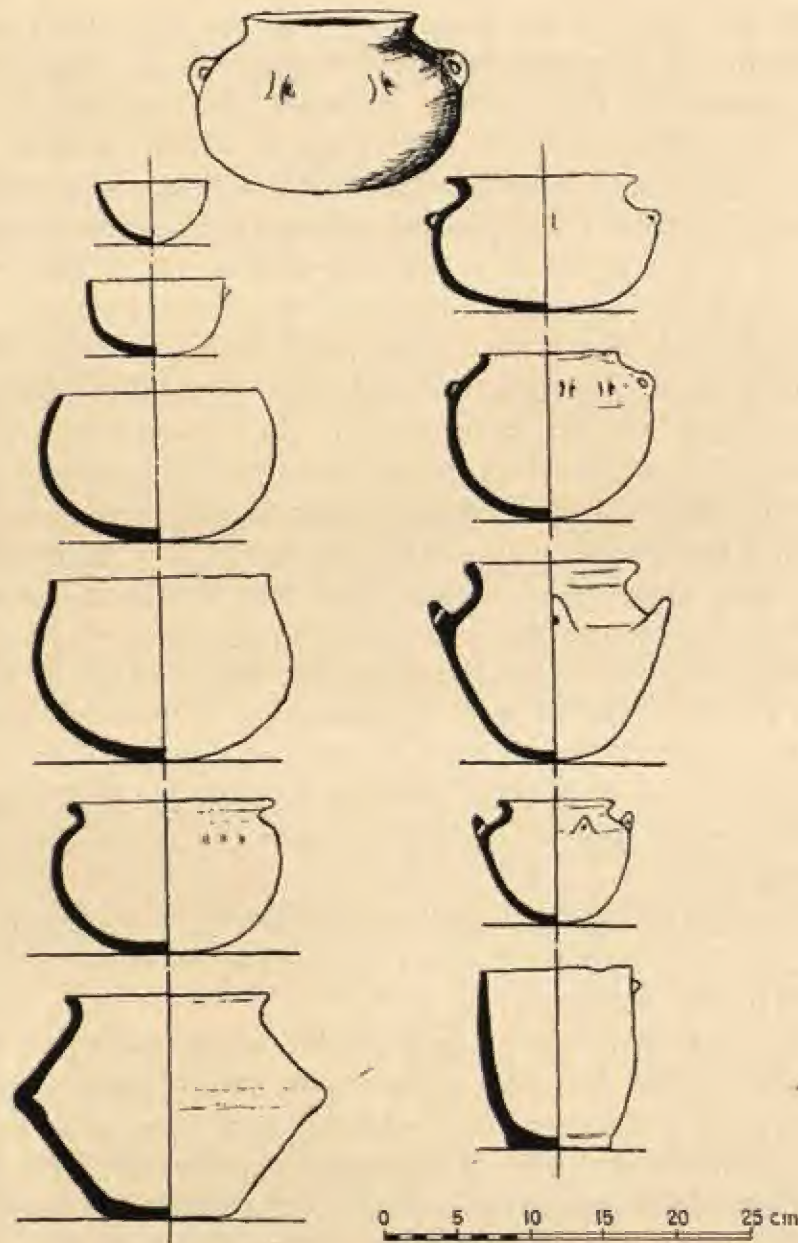


Fig. 6. Pottery vessels from the Cova de ca s'Hereu and the Cova de sa Garriga de ses Comes (the upper vessel).
From *Anuari de l'Institut d'Estudis Catalans*, vi, 559, 560.

sisted of a main chamber 11 ft. 6 in. long, approached by a passage placed at one end and almost at right angles to its long axis. Opposite to the entrance was a single small circular chamber about 3 ft. in diameter. In the main chamber, lying lengthwise and buried in earth, were found two rows of skeletons side

by side and head to foot, with pottery vessels arranged in lines between them. There were two layers of earth containing bodies and pottery, and a third containing pottery only; the lower layer was so arranged that the head of one skeleton overlay the legs of its neighbour; in the upper layer there was no overlapping. Some of the vessels were comparatively large and thick with upturned lugs, similar to those from the Cova de ca s'Hereu (the third and fourth vases in the right-hand column of fig. 6). Others were globular vases with small loops, sometimes interspersed with small bosses or knobs in varying numbers and proportions. On some vessels the knobs alone appear in large or small numbers; a pot may bear a single group of three, three groups of two, a pair only or even a single one (for the vases with loops only, see the uppermost and the first and second in the right-hand column of fig. 6). There were also plain cups about 4 in. in diameter with no loops or knobs. Some of these had a flattened base with a very slight omphalos. It is particularly to be noted that these cup-like vessels were blackened inside by fire, suggesting use as lamps.

The pottery is assigned by its discoverers to different dates, the earliest to the latest period of the culture of El Argar in south-east Spain which Professor Bosch Gimpera has dated from about 2500 B.C. to about 2000 B.C. If these views be accepted, the construction of the Son Mulet cave is not likely to have taken place before 2000 B.C. Precise dating is not possible in the present state of knowledge of the Aeneolithic and Bronze Ages of eastern Spain, but it may be noted that Mr. Gordon Childe in the *Dawn of European Civilization* (p. 130) suggests 1700 B.C. to 1200 B.C. as an alternative date for the culture of El Argar, and the present writer would prefer a central date of 1500 B.C. for these Mallorcan tombs.

Professor Aguiló is also of opinion that some of the Son Mulet pottery coincided with that of the earlier culture of the talayots (the megalithic buildings peculiar to the Balearic Islands).

In the small side-chamber of Son Mulet were lying five or six crouched skeletons arranged in the form of a star, with their heads to the centre, and with them a copper or bronze dagger-blade of a type which again suggests connexion with Almeria (fig. 7).¹ There were also found in the tomb a number of small shells pierced for stringing, a tanged arrow-head of bronze, and a handful of small rods of the same metal which are usually classed as awls. They are about 1½ in. long, of square section, and pointed at either end. These, too, can be paralleled from sites in Catalonia of the Aeneolithic period,² and from the

¹ See Siret (Henri and Louis), *Les premiers Âges du Métal dans le sud-est de l'Espagne*, passim, and a group reproduced in *Questions de Chronologie et d'Ethnographie Ibériennes*, 1913, p. 337, fig. 148, by Louis Siret.

² For examples see Dr. Luis Pericot y Garcia, *La Civilización Megalítica Catalana y la Cultura Pirenaica*, Barcelona, 1925, pl. xii.

ca s'Hereu cave. Other discoveries in the main chamber were a plain conical button of bone with V-boring and a disc of lead about 2 in. in diameter, bearing rectilinear decoration and a small central knob similar to one illustrated in fig. 603 of the *Anuari*, vol. vi, which was found in one of the Coves d'Es Morro near Manacor. Bell beakers are often found in association with such finds of this period on Catalanian sites and a fragment of one of these beakers was found together with El Argar pottery in a Mallorcan cave near Felanitx.¹ This cave was a large one, apparently of habitation type having a single chamber 200 ft. in diameter and known as the Cova dels Bous.

The systematic examination and excavation of the monuments of the Balearic Islands was begun in the year 1916 by the Institut d'Estudis Catalans,

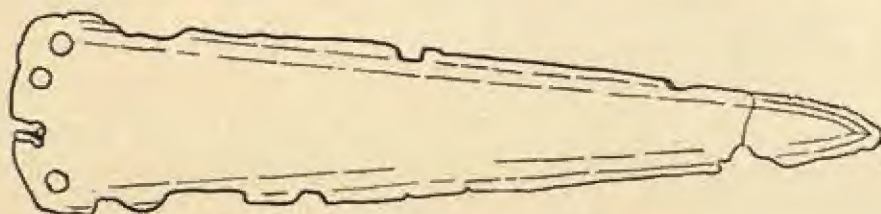


Fig. 7. Knife-dagger from Son Mulet. (§).

and has already produced admirable results. Of great importance for the study of megalithic caves are the investigations of Señor J. Colominas Roca to which reference has already been made; these were carried out between the years 1916 and 1920, and are recorded in vol. vi of the *Anuari* of the Institut, pp. 555-73 (*l'Edat del bronze a Mallorca*); while a paper on the caves in the neighbourhood of Santa Eugenia by Señor Vicens Furio was published in the same journal in the same year (pp. 548-55), and is of particular interest to the student of Mallorcan caves.

Cave 6.

Cave no. 6, which adjoins no. 7 on the west (fig. 3) has been much mutilated, partly owing to the natural disintegration of the rock, and partly by use as a shelter. For this purpose the already widened doorway has been narrowed and partly built up, while beam-holes cut into the rock above it show that in comparatively recent times a roof has been extended in front of it. Few of the internal features of the cave are at present well defined except an end chamber, as large portions of the roof and sides have fallen, and the floor is covered with soil and debris. Soil also covers the forecourt and renders it impossible to make a detailed plan, but the main features are shown in fig. 3.

¹ *Hispania*, p. 164, and *Anuari*, vi, p. 557.

It is probable but not certain, that the cave contains a central trench similar to that found in caves nos. 8, 9, and 14. There is now no trace of any shelf above the entrance, and it is improbable that there ever was one.

Cave 8.

The forecourt and entrance of the easternmost cave of the trio were covered by a small building until recently. The entrance was built up and a hut occupied the forecourt. The remains of the hut still encumber it, and only the main outlines can be recorded on the plan (fig. 3).

This cave also contains large quantities of stones and earth which hide some of the details, but its features are of some importance, one being the double vestibule. The measurements on which the plan is based were taken at the surface of the debris which encumbers both the vestibule and the main chamber. Although, as already mentioned, the state of the cave makes any accurate description impossible, a step down is clearly traceable within the entrance, and so is a narrow trench down the centre of the cave, which suggests affinities with the San Caulellas cave (no. 14), although it is shorter and narrower than in that case, and so far as can be seen at present the bench on either side of it is not subdivided by ribs. The depth of the trench was ascertained at 16 ft. from the northern end of the cave, where the floor was found to be one foot below the level of the bench. There are two side-chambers, the position of which is shown on the plan.

The main entrance was originally 2 ft. high by about 18 in. wide. It was surrounded by an external rebate 6 in. deep, and 2 to 3 in. wide. The bottom of the doorway is 1 ft. 9 in. above the level of the forecourt (pl. xx, fig. 1). The two sections of the double vestibule were originally roofed by the slabs of stone, and not, as in all the other cases in this group, by natural rock. The present condition of the rock, which is singularly free from decay, suggests that this was probably done deliberately, and the remains on the upper surface of a rebate into which the stones were fitted are still clearly visible. Each section of the vestibule was separately roofed, and the arch of rock containing the entrance from one to the other is still complete, as is that which forms the entrance from the forecourt.

Further excavations will be necessary before it is possible to say to what extent the division of the vestibule into two sections was a definitely structural feature, but all the available evidence suggests that it was so, and that the sections were separated by a doorway similar to that leading in from the forecourt.



Fig. 1. Cave no. 8: entrance partly cleared.



Fig. 2. Cave no. 14: entrance

Published by the Society of Antiquaries of London, 1927



Fig. 1. Cave no. 12: interior, showing ledge and entrance to a side chamber



Fig. 2. Cave no. 9: forecourt and entrance

Cave 1.

Cave 1 is a large irregular-shaped one of natural origin adapted for habitation (fig. 8) which in recent times has been used for sheltering beasts, and possibly for occupation. It has been fitted with a door which has obliterated some of the original features of the entrance. Traces of a rebate, however, remain on the right-hand side. The left-hand wall of the cave is somewhat

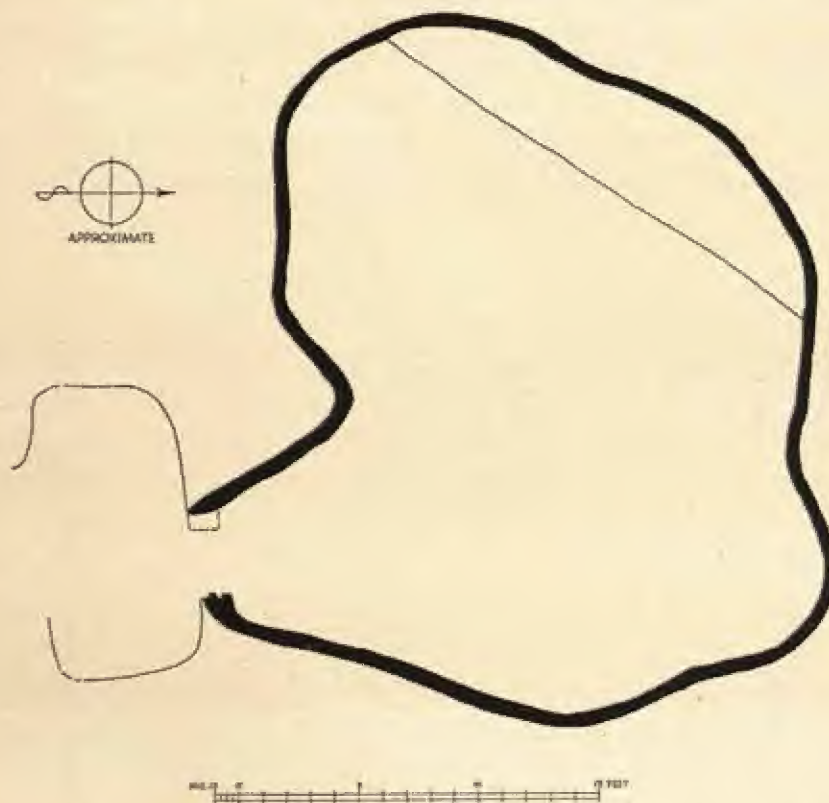


Fig. 8. Cave no. 1: plan.

obscured by piled-up stones, and a portion of the roof has been broken through at this side. Here also is the platform usually found in this type of cave.

The broad outlines of a somewhat irregular forecourt with rounded corners can be traced, but details are hidden by an olive tree growing in the eastern side of it, as well as by an accumulation of soil. Fifteen feet in front, and to the east of the entrance is a hollow in the rock; this appears to be artificial, and to have been in the form of an oblong basin with well rounded corners. It is, however, full of earth, and much of the side has been broken away. It appears to be ancient, but less so than the cave, as it has been carefully lined with a fine and hard cement, containing small particles of red pottery.

Caves 2, 3, and 4.

These also are habitation caves, and all their original features appear to have been destroyed. They are cut into the perpendicular face of a low cliff of rock at the bottom of the valley, and now open into a garden. They are used for storage and the deposit of rubbish. There may have been a fourth cave in this cliff.

Cave 5.

No. 5 is beside the track leading down to the stream, and is close to modern quarries. It is of the burial type, but has been badly mutilated, the whole of the western side and most of the roof having disappeared. It was apparently about 30 ft. long, and there are some signs of its having had an end-chamber.

Cave 9.

Cave 9 (fig. 9 and pl. XXI, fig. 2) is even more encumbered with earth and debris than the majority of those under consideration. The main features, however, are obvious. There are three side-chambers and one end-chamber. It has a central trench, the full extent of which cannot be determined without excavation, and the 'bench' is subdivided by transverse ribs, a feature which is also found in Cave no. 14. The entrance from the vestibule to the main chamber resembles that in a similar position in Cave no. 7 in having sockets for two horizontal timbers, but there is no provision for perpendiculars. The outer entrance, which is 3 ft. 6 in. high, 1 ft. 8 in. wide at the top, and 2 ft. 6 in. wide at the bottom, is slightly unusual as it contains a step down of a foot, and the roof is lowered to conform. Nine inches above this entrance is a shelf 2 ft. deep and of the same width as the forecourt, as in the case of no. 7.

The entrances to the side-chambers may have had timber sockets, but the state of the rock makes it impossible to be certain of this.

A unique feature as far as these caves are concerned is a small but carefully worked 'bracket' in the southern corner of the main chamber. This is 2 ft. 3 in. above the estimated original level of the floor, and is 5 in. thick; it extends for 15 in. against the south-eastern wall, and for 19 in. against the south-western. To some extent it follows the line of the curving angle at the junction of the walls so that its greatest width is only $3\frac{1}{2}$ in.

The forecourt is considerably smaller than those of nos. 6, 7, and 8, its length along the main axis of the cave being only about 3 ft. and its width about 13 ft. It has the usual rounded corners, but no further details can be given as it is still covered with earth to a considerable depth. The natural

slope of the rock would have allowed a larger forecourt, but not one so large as those of Caves nos. 6 and 7.

Nine feet south of the centre of the entrance a 'socket' has been carefully

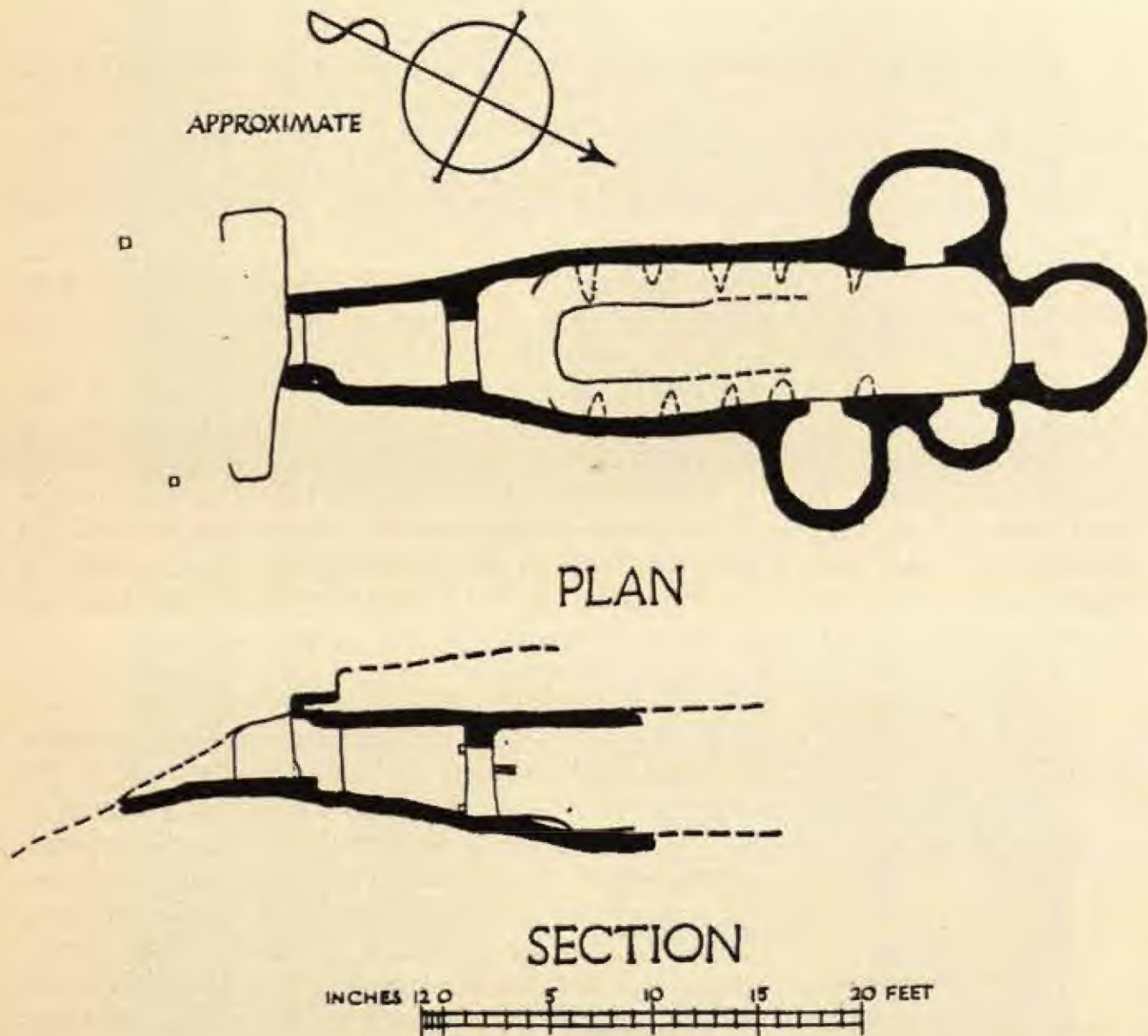


Fig. 9. Cave no. 9: plan and section.

cut in the rock, 6 in. deep, and approximately 7 in. square (pl. XXI, fig. 2). The bottom of the hole is horizontal, but its sides are at right angles to the sloping surface of the rock, so that that nearest to the forecourt is 6 in. deep with an overhang of $2\frac{3}{4}$ in., while the opposite one is only half the depth. In a more or less corresponding position is a second hole; this is not well preserved, but must

originally have been considerably smaller and shallower, probably about 5 in. square; it is now 2 in. to 3 in. deep. A block of stone lying in the forecourt may possibly have been used to close one of the entrances.

Cave 10.

Cave 10 is a symmetrically cut habitation cave 4 yds. wide by 3 yds. deep. Inside on the right is a small platform 6 ft. wide by 3 ft. deep and about 2 ft. high, and at the back is a second and larger one about 5 yds. long by 4 ft. deep and 2 ft. to 3 ft. high. The entrance has been somewhat mutilated, but was about 6 ft. wide and perhaps 5 ft. high. Five feet from the entrance the roof is pierced by a 'chimney' about 10 in. in circumference. A rebate on the surface of the rock suggests the use of a cover-stone to close it. If any forecourt exists it is now entirely covered.

Cave 11.

Cave 11 closely adjoins no. 10, and is also a habitation cave. It was originally almost circular, with a diameter of 3 yds. and a height of perhaps 7 ft. The entrance is much broken away, and the forecourt, if there be any, is entirely obscured by shrubs; but the western side of what appears to be a wide trench cut in the rock leading to the entrance is traceable, running almost straight for about 6 ft. Four inches from this face, on the left facing the cave, a socket or basin is cut in the surface of the rock. It is of irregular shape, but has two straight sides at right angles measuring 8 in. and 6 in. respectively.

Cave 12.

Cave 12, the Cueva dels Esmeriets or Coba dels Armaris, is about 400 yds. from the group last described, at a sharp turn in the main track leading to the

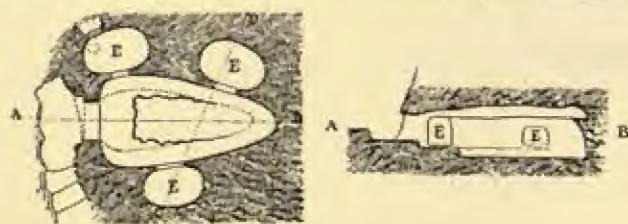


Fig. 10. Cave no. 12: plan and section.
From Cartailhac, *Les Monuments primitifs des Îles Baléares*, fig. 36.

large quarries which reach almost as far as the cave itself. It is of the burial type, and a rough plan and section of it were published by M. Cartailhac as fig. 36 in *Les Monuments primitifs des Îles Baléares* (fig. 10). This plan shows that the cave was furnished with three irregularly placed side-chambers, and

also ledges similar to those in no. 7. Here, however, no cups or rings are engraved upon them. Inside, the rock is well preserved (pl. XXI, fig. 1). There is no sign of a central trench or a side bench, nor of timbers having been employed to close the entrances. There may have been a shelf above the door, but this is doubtful. There is a small forecourt having the usual rounded corners. The entrance has been much mutilated.



Fig. 1. Cave no. 14: entrance from interior



Fig. 2. Cave no. 14: interior showing pilaster, and bench, in transverse rib

Cave 13.

Cave 13 is known as the Cueva de la Mata o Paye, or Coba Mata, from the very large bushes, or rather trees, of Lentisk which grow above and in front of it completely hiding it. The growth of one plant, which is of extraordinary size, is largely responsible for the fact that the roof above the entrance is considerably broken away. The cave is a habitation one of large size and oblong shape, being 30 ft. deep and from 20 ft. to 25 ft. wide with a flat roof 9 ft. above floor level. There appears to have been a forecourt of rounded type, but accurate measurements would be impossible without a considerable amount of clearing.

*The Santa Eugenia Group.**Cave 14.*

The caves belonging to this group are to be found in the neighbourhood of the village known as Santa Eugenia. Most of them lie to the north-east of it, but the most important of them, no. 14, is some distance away between the hamlets of Portol and Sa Cabaneta. It lies in the garriga (i. e. rough uncultivated land used as a preserve for rabbits and game—and in this case covered with pine trees) attached to the farm of Son Caulellas in the outskirts of Sa Cabaneta. A diagram and section of the cave have been published by Señor Vicens Furio at p. 255 of vol. vi of *Anuari de l'Institut d'Estudis Catalans* (1920). It is, however, wrongly described as lying in the garriga of Son Curelles. The actual position of the cave is about 300 yds. south of the 'r' of 'Portol' on sheet 214 of the Spanish 'Mappa Militar'. It is placed below the crest of the hill and its position is in no way a conspicuous one, lying as it does on a gentle slope on the north-east side of a ridge—the Puig de Son Segui which projects from the Santa Eugenia group of hills.

The quality of the rock which made it suitable for the purpose of the diggers of the cave, namely its even texture and the ease with which it can be worked when first exposed to the air, has caused it to be much sought after for building purposes, with the result that quarrying has destroyed the greater part of the original surface of the ground for a considerable area in the immediate neighbourhood of the cave, and has to some extent impinged on the space occupied by the monument itself.

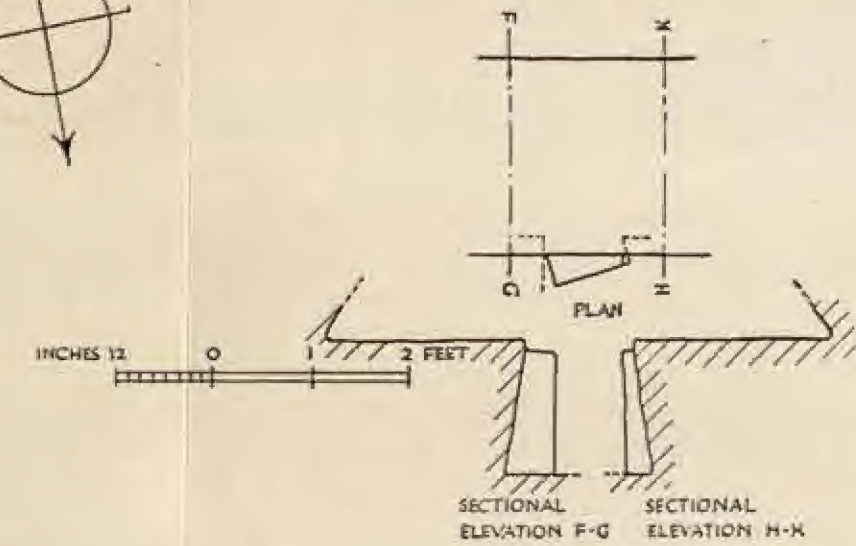
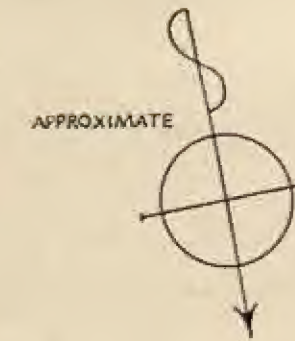
The diagram published by Señor Furio recorded the main features of the actual cave. A certain amount of excavation on the surface of the ground carried out in January 1926 has, however, brought to light two additional features, which add considerably to its interest and may prove it to be an important

link in the historical development of this class of monument (pl. xxiii). The first of these to be discovered was a trench 12 ft. long, having an average depth of 1 ft. and a width of from 8 in. to 10 in., cut in the rock at the head of the stairway by which the cave is entered (pl. xx, fig. 2). This groove suggests comparison with the curving trench, similarly cut in the rock, which marks one part of the boundary of the tumulus, or rather platform, which covers the cave near Arles known as La Grotte Bounias (p. 155, figs. 17-19 and pl. xxiv, fig. 2), and which carried a series of upright stones.

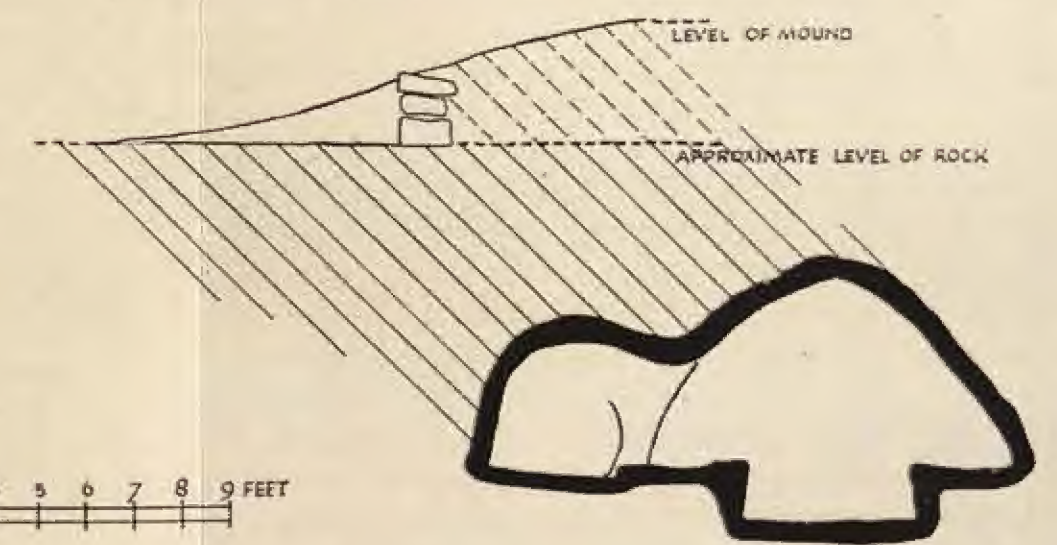
At Son Caulellas the trench is straight, has well-defined ends, and is symmetrically placed at right angles to the main axis of the stair. Approximately at right angles to the north end of the trench, a low and slight retaining wall, 1 ft. 6 in. high, has been built; this now begins at 14 ft. from the end of the trench and in a line with the doorway of the cave, but may have extended as far eastwards as the trench; the soil around the entrance to the cave, however, has been disturbed, and at this point is also partly covered by material cleared out of the interior in recent times. The retaining wall continues in a westerly direction for at least 30 ft. There can be no doubt that this wall is ancient, and it certainly supports and is covered by a long artificial mound, which extends laterally for about 2 yds. beyond the foot of the wall, before dying away into the level ground. The interior of the mound, where examined, was found to be constructed of flat stones and earth. The small amount of excavation which could be carried out, failed to reveal a return wall at the west end, and the south side has been mutilated and partly covered by the spoil heaps of the stone quarries.

It is possible that further examination of the external features of the monument might afford more definite evidence of the purpose of the trench and its relation to the mound; meanwhile it may be suggested that the retaining walls originally extended as far as the trench, which last carried upright slabs of stone closing the approach to the cave. In this case the stair may have been roofed with horizontal slabs and these covered by the mound, or the entrance may have been sealed by some such device as that employed at La Grotte Bounias (fig. 18).

In spite of the lowness of the mound and its retaining wall, the general type and the methods of construction closely resemble those found on a larger scale in the British long-barrows, and it is difficult to resist the conclusion that the Son Caulellas cave itself was originally covered by a long-barrow. The line of the wall is parallel to the axis of the entrance, and it may be assumed that this last, together with the rock-cut trench, was symmetrically placed in relation to the mound; the axis of the cave itself, however, is at a considerable angle.



CAVE NO. 14: PLAN AND SECTIONS



SECTION C-D

Entrance to the cave is by means of three irregular steps, which are contained in an uncovered rock-cut chamber. This chamber may correspond to the forecourts and vestibules of the caves of this type which are entered on the level (e.g. nos. 6, 7, 8, 9, and 12), but the Grotte des Fées has both stair and vestibule as well as a forecourt.

At the foot of the lowest and steepest step there lies at present a large block of stone, possibly placed there for convenience in modern times to form another step. The doorway in its general form closely resembles those of Caves nos. 6, 7, and 8, but there is no sign of a rebate or of socket-holes.

Immediately within the doorway is a step down to the level of a bench which entirely surrounds the central area; this, which in Cave 8 is a narrow trench, is here the main floor of the chamber (pl. xxii, fig. 1). The bench averages 2 ft. in width and 1 ft. 6 in. in height above the level of the floor which is completely uncovered, the contents of the cave having been removed within the last few years. A rectangular block has been cut out of the bench at the entrance. Tool-marks suggest that this was almost certainly done in recent times, and the block¹ still remains inside the cave. The bench is divided into sections by transverse ribs, usually about 1 ft. wide where they butt against the wall of the cave, and tapering towards the edge of the bench; the intervening spaces being slightly dished. Similar ribs are found in Cave no. 9.

Towards the end of the cave, where the bench is doubled in width, a clearly defined boss of rock has been left on the south side projecting 6 in. above the surface of the bench; it is possible that these two features may be intended to mark the traditional site of an end-chamber which is not otherwise represented. There are no socket-holes at the entrance to the single side-chamber. The form of this chamber is sufficiently indicated by the plan and section.

One feature seems to be unique: a pillar or rather a pilaster attached to the bench on the southern side (pl. xxii, fig. 2). This is very carefully worked; the illustration and the plans and profiles record its shape better than any description; it is enough to say that it rises from the floor to within about 2 in. of the top of the bench. No markings of any kind were observed upon it; and there is nothing corresponding to it in this cave or in any of the others described in this paper. It is perhaps conceivable that it served as an altar, such as may have been carried by the socket which occupies a somewhat similar position in relation to the step surrounding the forecourt of Cave 7, which moreover has no internal bench. This would imply that the bench in the one case represents the step of the forecourt of the other. No. 8, however, has both forecourt and internal bench.

¹ It is not indicated in plan or section.

Cave 15.

This cave, known as the Cova de la Cuineta,¹ is placed in rough ground in the face of a low cliff formed by an outcrop of level strata of stone. The main axis of the cave, approximately north-east and south-west, lies parallel to the edge of the cliff, the opening being to the north-east. The cave is actually contained in a projecting mass of rock, which, viewed from below, bears some

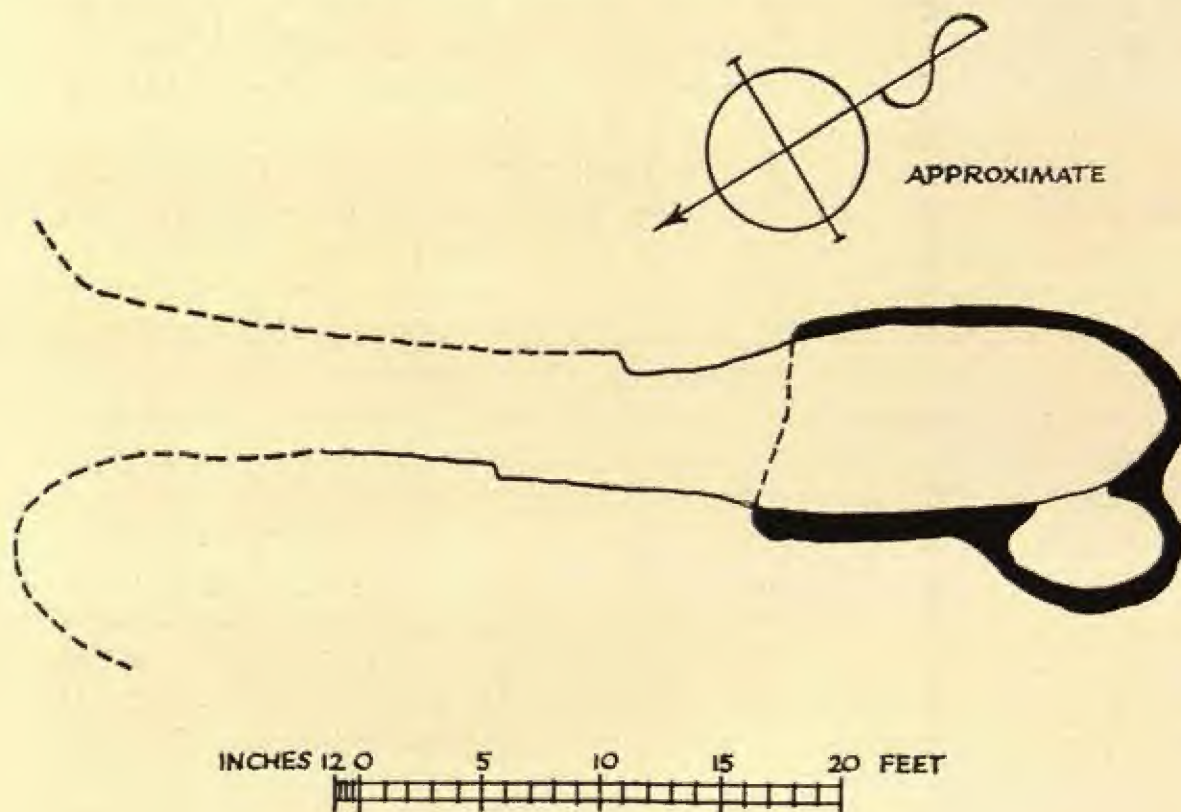


Fig. 11. Cave no. 15: plan.

resemblance to a long-barrow. This resemblance is accentuated by the fact that the entrance is approached by a clearly marked trench which is partly cut in the rock and is flanked on either side by horns, similar to those which define the entrances to many British long-barrows (fig. 11).

Without excavation, it is difficult to say with any certainty to what extent this formation is due to natural causes; for instance, the continuation of the trench where it is not rock-cut may be partly due to the long-continued use of the cave as a shelter for beasts. The north-eastern horn dies away into the rising slope of the hill; the south-western, however, is well marked, and it is

¹ Also described by Señor Furio, with plan and sections, *op. cit.*, p. 553 (fig. 252).

difficult to imagine that it can be due to natural causes, especially as the trench which it bounds is cut in the rock for at least 18 ft. on the south-west side, while for a distance of 13 ft. a retaining wall is built upon this rock, thus raising the side of the trench to a height of 3 ft. or 4 ft. Part, at any rate, of this wall appears to have been rebuilt (fig. 12), but it is most improbable that it is entirely modern, as the amount of soil which it retains is too small to have been of any



Fig. 12. Cave no. 15: retaining wall.

practical use for cultivation. A similar combination of rock and dry-walling forms the sides of the descending approach to the entrance of La Grotte Bounias near Arles (fig. 18).

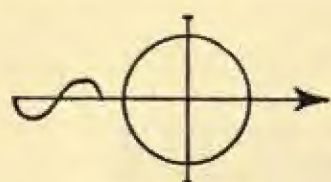
The north-eastern side of the passage is not so well defined, as the rock is lower and an olive tree covers several feet of the line it must follow if it is symmetrical with the western side. Excavation is necessary before any definite claim can be made that this cave can be classed among the long-barrow type, but the probability that it should be so is strengthened by the much clearer evidence provided by the Son Caulellas cave. As usual, the floor of the cave itself is cumbered with stones and earth, and the rock is considerably eroded, but the general form is quite clear, and is recorded on the plan.

Cave 16.

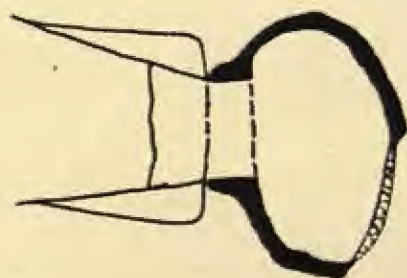
The *Cova del Vent* is placed in a continuation of the same outcrop as no. 15, where it dies away into the level. Its axis lies approximately north-west and

south-east at right angles to the fall of the ground, which here is so slight that steps are necessary as in the case of Cave 14.

A diagram and section which show that there is a side- and an end-chamber have been published by Señor Furio,¹ but the end-chamber is of greater length than appears in the drawing.



APPROXIMATE



PLAN



SECTION



Fig. 13. Cave no. 17: plan and section.

*The Alcudia Group.**Cave 17.*

Monsieur Cartailhac refers to the existence of caves in the neighbourhood of 'the most faithful city' of Alcudia,² where suitable rock abounds, and some forty paces south-east of the south-east corner of the church of Alcudia, beside the pathway which runs between the inner and outer lines of fortification, is the entrance to a cave. This has a stairway of the type found in Cave no. 14, of which only the lowest step is traceable under the accumulated rubbish. The doorway, which is 3 ft. 6 in. high and 4 ft. wide, is of the San Vicente type, with well-

marked sockets for two horizontal timbers; the lower of these is, however, placed above the threshold instead of below it as at San Vicente (pl. xxiv, fig. 1). The rock is fairly well preserved on either side of the stair and shows no trace of any rebate for cover-stones. The stair chamber is at least 8 ft. long.

The cave itself is unlike any other of those described in this paper. It is at present of oval form, being 11 ft. 3 in. wide and only 6 ft. deep from the inside of

¹ *Op. cit.*, p. 552, figs. 250, 251.

² *Les Âges préhistoriques*, p. 142.



Fig. 1. Cave no. 17: entrance



Fig. 2. La Grotte Bounias: rock-cut trench



Fig. 1. La Grotte des Fées: courtyard.
The figure stands
at end of shelf



Fig. 2. La Grotte des Fées: entrance

Published by the Society of Antiquaries of London, 1927

the doorway (fig. 13). In the rear wall to the right of the centre line is a second opening. To judge from its appearance this opening probably led into one of the usual small side-chambers, but it is now blocked by a rough wall of rubble masonry. The probable explanation of this is that when the ditch of the Roman town wall was made it cut off a part of the cave, and the hole thus made in the perpendicular counterscarp of the ditch was blocked by the engineers. It is, however, not possible to speak with absolute certainty, as the ditch at this point has been filled in and is now covered by a garden. The entrance faces approximately south, and there is no trace of a shelf above it.

Cave 18.

A little to the west of Cave 17, between 50 yds. and 60 yds. south-west from the south-west corner of the church and between the two lines of fortification, is another and much mutilated burial cave. Stone quarrying has destroyed the approach and entrance which were at the south end, as well as a side-chamber on the east side; while conversion to a stable has caused the lowering of the floor and the making of new entrances. One interesting feature remains intact however, a projecting ledge 4 ft. long which has been worked on the east wall. The ledge begins at 3 ft. from the north end of the cave, its greatest width is 6 in., and it is about 1 ft. below the roof and perhaps 4 ft. above the original floor level. The ends are brought up to meet the curve of the roof and die away in it, giving a profile like the section of a boat. In all probability the cave was originally from 20 ft. to 25 ft. long and 8 ft. high.

Cave 19.

Three or four yards to the west of Cave 18 is an interesting habitation cave, entirely worked in the rock. Admittance is now by a hole in the quarry face which has cut into its northern side. The original entrance on the south side is blocked by the outer line of the fortifications of the town, but enough remains to show that the approach was by a stairway terminated at the inner end by a doorway of the usual burial-cave type, differing however in the important detail that the timber holes are so placed that the door must have been barred from the inside.

The cave is roughly circular, measuring about 20 ft. by 16 ft., and is divided into shallow bays by ribs of rock which die away into the roof, a curiously 'architectural' feature. In one bay is a platform 6 ft. long having an extreme width of 4 ft., and raised 6 in. to 9 in. above the floor level. Some shallow shelves may be of later construction than the cave itself, but at least one shaft in the roof seems to have been an original ventilation hole.

Cave 20.

Mr. Crawford discovered another cave near Alcudia. It is placed in a symmetrical boss of rock rising from the level ground a few hundred yards from the sea, and about a quarter of a mile a little east of north from the town.

It is of the burial type and has some unique features; as usual it has been disfigured by conversion to a stable. It is orientated slightly west of north and slightly south of east, and is entered from a forecourt, partly quarried away and now only 3 ft. deep; the court was unsymmetrically placed with regard to the entrance, extending 4 ft. 6 in. to the north of it, but only 1 ft. 6 in. to the south.

From the forecourt there opens a vestibule 5 ft. long, now covered by a modern roof, but possibly left open originally; the south side of the vestibule is occupied by a seat 1 ft. wide. Entrance to the main chamber is through a mutilated doorway, originally by one or more steps. Immediately within the doorway is a second vestibule 3 ft. long, contained in the main chamber, marked on the south side only by a slight enlargement of 6 in. to 9 in., which dies away at the centre line of the roof, and on the north by a seat 3 ft. long and 1 ft. deep.

The main chamber is 6 ft. wide, 6 ft. high, and has a total length of 24 ft., including the inner vestibule. At 15 ft. from the eastern end the northern half of the roof is occupied by a circular shaft 3 ft. in diameter; this has been carefully blocked by a large stone backed by smaller ones and earth, so that it is invisible on the surface of the ground. In the south wall of the chamber, beginning about 7 ft. 6 in. from the east end, a shelf in the form of an alcove has been cut in the rock 3 ft. above floor level, presumably an addition. The presence of this and of the shaft may point to re-use of the cave for residence, but the shaft shows no signs of tooling and is clearly ancient.

There are no signs of ancient timber holes for closing the entrance, nor of a bench or ledge. At the eastern end are three cavities in the floor about 1 ft. in diameter; these may be modern and connected with the use as a stable.

Cave 21.

On the south-east shore of the bay of Alcudia is the modern settlement known as Colonia de San Pedro de Artá. In its eastern outskirts is a small hill crowned by a windmill, and a few yards south-west of the mill is a small cave. It somewhat resembles no. 8 in having a double vestibule open to the sky formerly divided by an archway, which is now removed. There are, however, no rebates for cover-stones, and the approach seems to have been by a stair in the outer chamber: all this end of the monument has been mutilated and partly quarried away. When first discovered the vestibule was filled with stones and earth.

The entrance to the main chamber is of the usual type and has a rebate, but no timber recesses. The main chamber was completely encircled by a bench, partly mutilated in recent times; it bears no transverse ribs nor is there any ledge. Near the entrance on the right hand is a side-chamber, having a wide and simple opening, and at the far end on the main axis of the cave is a second having a narrow entrance which shows no sign of having been closed.

The ground above is bare and level and on it lie many fragments of typical cave pottery, while one complete vessel from the interior is in the possession of Señor Lorenzo Garcias Font of Artá—it is a small globular pot with suspension loops of the type illustrated in fig. 6.

When first discovered some years ago the vestibules were filled with earth and stones, but no other details are now available.

The Son Suner Group.

Cave 22.

One cave at Son Suner, $5\frac{3}{4}$ miles south-east of Palma, still illustrates one method of closing the burial caves which were entered from a stairway. The cave in question is one of a group placed in the low hill which is crowned by the old house of Son Suner. Its existence has been revealed by quarrying which has opened a way into it through a side-chamber, leaving the original entrance untouched, and, from above ground, invisible. The vestibule containing the stair has been filled with large stones at the doorway, and these are backed by smaller stones and earth. The doorway is 3 ft. high by 2 ft. 6 in. wide, and no timber holes are visible. There is no sign of any mound above the cave, but in any case it would probably have been removed by the quarry men. The main axis is approximately east and west, the entrance being at the west end. The main chamber is 26 ft. long by 10 ft. at its widest, and is surrounded by a bench without divisions 3 ft. wide. The roof is flat and is 4 ft. above the level of the bench. There is about enough earth in the cave to fill it up to the level of the bench. This earth has been much disturbed, but it is not likely that any has been removed.

There are three side-chambers. One immediately adjoining the entrance on the south side is 5 ft. deep by 5 ft. 6 in. wide, having a doorway 2 ft. 6 in. wide and of the same height; there are no timber holes in this or either of the other two entrances to the side-chambers. The second chamber is 12 ft. from the entrance on the south side, and is 4 ft. deep by 5 ft. wide, and has an entrance 2 ft. 6 in. by 2 ft. 6 in. The third has the same dimensions as the second, and is 7 ft. 6 in. from the east end on the north side. This chamber now forms the entrance to the cave.

Although the method of closing is very possibly the primitive one, it is quite likely that the cave itself may have been re-used at almost any period after its construction; at least one of the caves of the group was used in Roman times, and another shows many signs of adaptation for residential purposes.

Cave 23.

An important discovery of an unsuspected and intact burial-cave at Son Jaumell, close to Capdepera, is recorded by the Rev. Father Lorenzo Lliteras of Palma, in the *Correo de Mallorca* for 22nd April 1927, and by Señor A. Crespi in a letter to the present writer.

It was approached by an open chamber leading through a passage 2 ft. long to a vestibule 5 ft. 2 in. long and 2 ft. 2 in. wide. This was roofed by a single stone 6 ft. long by 3 ft. wide. The entrances from ramp to passage and from vestibule to cave were closed by single slabs of stone fitted into rebates $2\frac{3}{4}$ in. wide.

Immediately within the chamber were three steps 3 ft. 11 in. high which led down to the level of the floor. The chamber was elliptical in shape, 15 ft. long by 6 ft. wide tapering at the far end. It had a side-chamber on either side of the entrance 4 ft. 6 in. high by 3 ft. 9 in. in diameter. Above the cave was a mass of small stones, about the size of almonds or a little larger, which had apparently been obtained by the excavation of the monument.

Inside the chamber was a large jar 1 ft. in diameter, and near it large numbers of others—some forty were preserved intact—of different sizes and shapes, plain and decorated. Some had lugs slightly pierced horizontally or perpendicularly, some had a simple knob and no lugs, while others had a ring of knobs between the lugs near the rim. All contained human bones, shells, or objects of some kind, the small ones little human bones or teeth. The pots occurred in greatest quantity in the side-chambers, especially the right-hand one. Almost all the pottery was blackish.

Lying at length in the centre of the chamber was a complete skeleton.

Other finds, besides the shells, were a bronze knife-dagger, having four rivets, and what appears to have been an awl of bronze 4 in. long, and a circular ivory disc, $1\frac{3}{8}$ in. in diameter, pierced near the rim by two holes for suspension.

Thus this cave has the usual furniture, but provides new evidence as to the methods of sealing up these tombs and disposing of the displaced material—possibly in the form of a tumulus. It also explains the use of the vessels, to hold bones and offerings.

Son Mari.

An exceptionally interesting group of three occupation caves was discovered some years ago during the building of the house of Son Mari, five-

eighths of a mile south-west of the fourteenth kilometre post on the road from Artá to Santa Margarita, and five and a half miles east of that town.

The site chosen was occupied by the remains of a group of talayots, the stones from which were used in the construction of the house: there were also discovered three roughly circular habitation caves; one of these now forms part of the large subterranean water-tank which is a universal feature of these houses, part of a second is used as a cellar to the house, and a third small one is still visible but much mutilated; this shows partition ribs similar to those in Cave 19.

Señor Antonio Maria Blanes Mestre of La Plaza, Artá, the owner and builder of the house, was kind enough to accompany Mr. Crawford and the

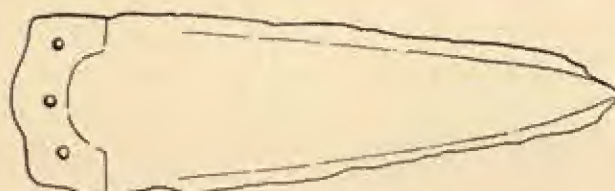


Fig. 14. Knife-dagger from Son Mari. (§)

writer to the site, and show such of the objects found during the building as had been preserved. In addition to coins and native pottery of the Roman period and two bone daggers, these included a knife-dagger of copper or bronze (fig. 14), resembling that from the Son Mulet cave (fig. 7). While the bulk of the finds came from the remains of the buildings, the knife-dagger was found on the floor of a subterranean passage connecting one of the caves with the interior of a talayot.

It would be easy to exaggerate the importance of this discovery, as no trained observer was present at the time it was made, but it is at least suggestive. Burial- and occupation-caves of the type described in this paper are certainly contemporary. These Son Mari caves were equally certainly used in conjunction with the talayots, and the finding of a knife-dagger of early type suggests that on this site at least talayots and caves may have been contemporary in origin.

This is not the place to discuss the many complicated problems presented by the various types of buildings which are indifferently termed talayots, problems which can only be solved satisfactorily by careful excavation, but it may be pointed out that some of those buildings had a very long history in Mallorca. The identity in type of bronze swords found in them¹ with others

¹ J. Colominas Roca, *Butlletí de l'Associació Catalana d'Antropologia, Etnologia i Prehistòria*, Barcelona, 1923, i, 93, fig. 36.

forming part of the Huelva hoard, which can be dated to between 1200 B.C. and 1000 B.C.,¹ suggests that they must have been in existence before the first millennium B.C., and they certainly remained in use in one form or another until the close of the Roman occupation of the island in the fifth century A.D.² Moreover, the problems connected with dating are not made simpler by the fact

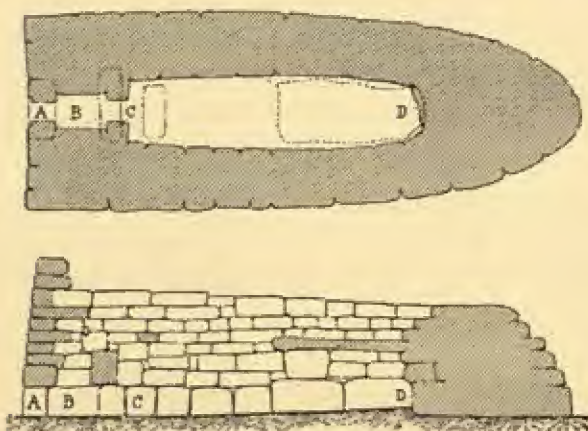


Fig. 15. Naveta of Es Tudons, Menorca: plan and section. From Cartailhac, *Les Monuments primitifs des Îles Baléares*, fig. 22.

that the 'culture of the talayots' seems to have persisted for the thousand years before the Roman conquest in 123 B.C., almost untouched by the great developments and movements which so deeply affected the greater part of Europe during that period.

The plans of the Mallorcan burial-caves suggest a close connexion with the megalithic tombs of the Balearic Islands known as Navetas (fig. 15), and a resemblance to the Sardinian rock-hewn burial-caves, which are similarly linked with the megalithic 'Giants' graves' of that island. The contents also

of the Sardinian graves are comparable as they include buttons with V-boring, daggers, and bell-beakers; and in this connexion it is to be noted that in the full Bronze Age the 'giant grave' was the burial-place of the chief, and the rock-hewn grave that of the lesser folk.³

The Arles Group.

M. Cartailhac drew attention to the resemblance between the San Vicente caves and the group of tombs near Arles, and more especially to the striking similarity between the plan of the Cave no. 7 and that known as the Grotte des Fées. Broadly speaking, the resemblance is undoubted, but there are essential differences as well as similarities in detail which have escaped the notice of a number of writers, who have described the Arles monuments and compared them with those at San Vicente.

¹ *Révue Archéologique*, xviii, 1923, 222-6; *Boletín de la Real Academia de la Historia*, lxxxiii, 1923, 89-91; *Actas y Memorias de la Sociedad Española de Antropología Etnología y Prehistoria*, ii, 1923, 37-40; *Antiquity*, i, 106.

² *Butlletí de l'Associació Catalana, &c.*, i, 88.

³ Professor Bosch Gimpera writes to me that 'The shard of beaker pottery from Mallorca is possibly a Sardinian importation, as it is of the type of the bowls with feet of Anghelu Ruju. It is also curious that "vases polypodes" are also found in South France'.

The group consists of one cave entirely cut in the rock; three which are rock-hewn trenches roofed with carefully dressed slabs of stone; and one *allée couverte*, a simple long chamber with sides built of small stones, and a roof of slabs.

La Grotte des Fées.

This most striking and impressive monument has often been described; it is placed on the summit of a small isolated hill known as the Mont de Cordes, which rises to a height of about 200 ft. above the low-lying marshes two and a half miles north-east of Arles-sur-Rhône. The hill has a fairly level top which at some period was converted into a 'hill-fort' by being surrounded with a dry-built wall, most of the features of which are now destroyed.

The apparent resemblance to the San Vicente cave no. 7 is certainly striking (fig. 16), but it is also essentially misleading, as what appear to be two side-chambers similar to those in the Mallorcan cave are really the two ends of a forecourt which lies open to the sky and quite outside the actual cave (pl. xxv, fig. 1). The plan by M. Cazalis de Fondouce, which is inaccurate in many details and is in fact nothing but a rough diagram, records one feature which may be important but is not now visible, namely, that the two wings of this courtyard are separated from the central portion by low sills, which are now covered by soil. The projections at either end of each sill, shown solid in the plan, mark the position of the slightly projecting portals of the two entrances. It is possible that we have here an earlier stage in the development of the smaller type of the Mallorcan forecourt, and that what M. de Fondouce describes as a rectangular vestibule with two wings became later the simple court with rounded corners; but before this suggestion can be accepted due consideration must be given to the Maltese forecourts, as found at Tarxien and elsewhere.

The monument lies east and west, the entrance being at the western end. It is placed on a level plateau and the approach is therefore by a stair similar to that leading into the Son Caulellas cave (no. 14). There is no evidence to suggest that this stair was ever covered in the manner suggested in the case of Son Caulellas. There is a continuous ledge near the top of the rock wall bounding the left-hand side of the stair, but it is due to the decay of the uppermost stratum of the rock (pl. xxv, fig. 2). At the foot of the stair—at present there is no visible line of demarcation—is a short passage leading directly into the forecourt.

Above the entrance to the cave is a shelf similar to those found in the same position in the Mallorcan caves nos. 7 and 9, the northern half only being unencumbered by rubbish (pl. xxv, fig. 1). It is about 7 ft. deep in the centre and

¹ *Mém. de l'Acad. de Montpellier (Sect. des Sciences)*, viii, pl. xi.

tapers to 5 ft. at its termination which is 3 ft. short of the end of the forecourt. The corner is rounded and dished. There is no record of this shelf in any of the descriptions of the cave.

The entrance from the forecourt to the cave is through a comparatively low passage from about 8 ft. 6 in. to 7 ft. 6 in. in height and 18 ft. 6 in. long,

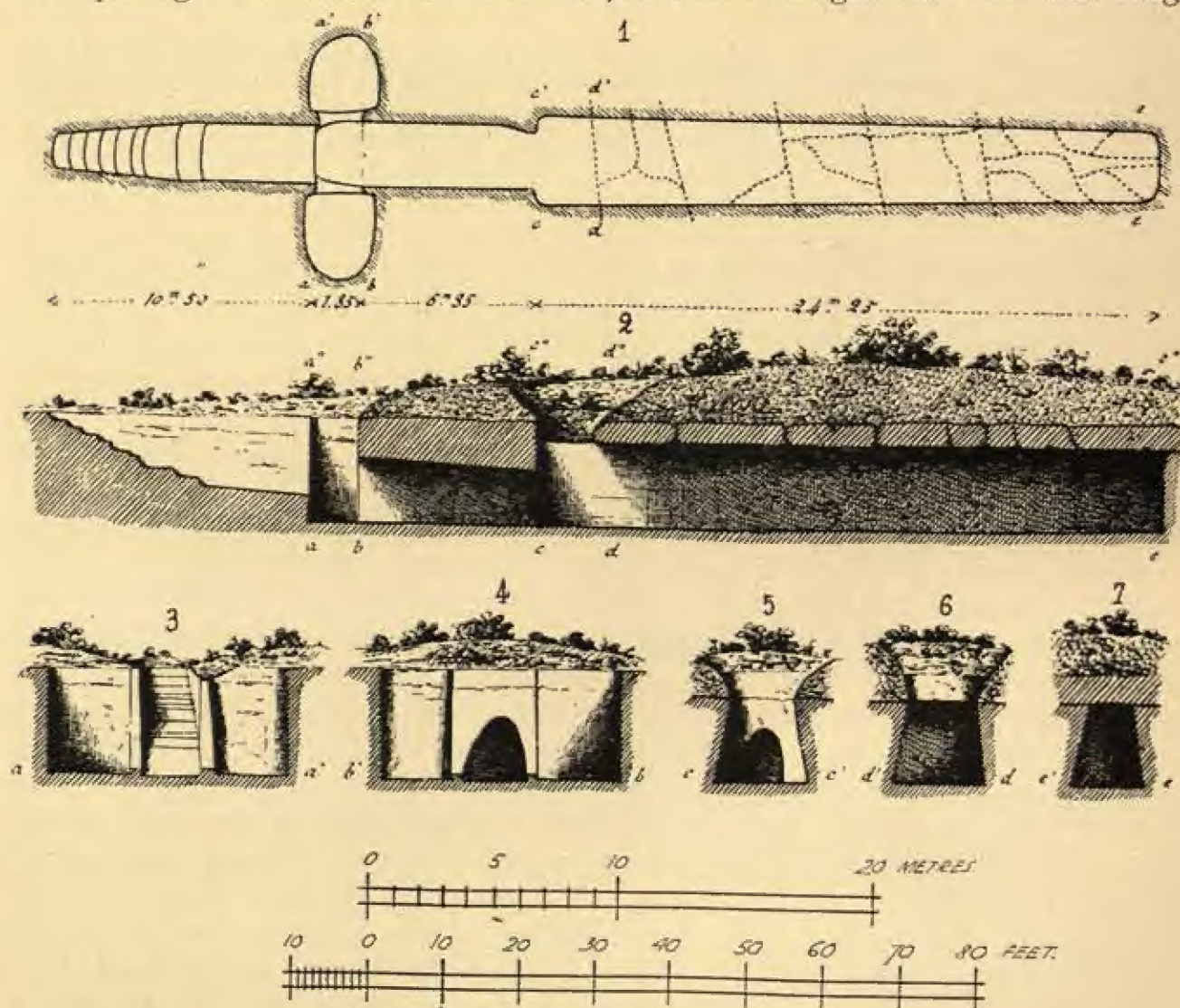


Fig. 16. La Grotte des Fées: plan and sections.
From *Mém. de l'Acad. de Montpellier (Sect. des Sciences)*, viii, pl. xi.

perhaps corresponding to the vestibule in the Mallorcan caves. The axis of this passage and the main cave is actually at a considerable angle to that of the stair and not as shown in the diagram, the inclination being to the south.

The main chamber is about 80 ft. long and 11 ft. high. The sides slope inwards but the roof is level; this has led to a curious mistake. All the accounts describe the chamber as being roofed by slabs of stone, but this is not the case.

It is a true cave entirely cut in the living rock. The excavators worked up to the natural line of cleavage along the level bed already noticed in the description of the stairway. This level bed provided an excellent roof. Perpendicular lines of cleavage certainly give the roof a superficial appearance of having been built of separate blocks, but careful inspection leaves no doubt of the true facts of the case. Examination is made more easy by the fact that a section of the roof above the western end of the chamber has collapsed. The point is of some importance as the cave has often been quoted as an instance of the *allée couverte* type of monument.¹

About the centre of the left-hand or northern wall of the chamber and just over 5 ft. above floor-level is an engraved figure which has been considered to represent a human being.² Immediately beneath it in the floor against the wall a basin has been worked in the rock, and opposite to it on the other side of the chamber is a second. These have been described but do not appear on the diagram. Another small feature which does not seem to have been recorded is the treatment of the corners at the east end of the chamber. In the rounded angles of these has been worked a perpendicular groove of semicircular section which gives them a fluted appearance.

The ground above and about the cave is so thickly covered with bushes that a close examination is impossible, but it is on record that there was a tumulus above the cave. It is probable that, as in the case of La Grotte Bounias and La Grotte de la Source, this tumulus was a comparatively level platform; but the form is not described.

No finds are recorded in the published accounts of the grotte, but the soil immediately around the entrance is strewn with fragments of pottery, many from hand-made vessels resembling in material those found in the Mallorcan tombs (one of them picked up by the writer may have formed part of a bell-beaker), and in a separate case in the Arles Museum is a group of potsherds containing a large ornamented rim piece of a bell-beaker and fragments of other unornamented pots, some furnished with lugs. These sherds are labelled as from the 'Allée Couverte de Cordes'.

It should be noted that the lists of finds from this and the other Arles caves are not necessarily complete, and are compiled in part from the published accounts, and in part from the labelling in the Arles Museum. For a list and six plates illustrating them see Cazalis de Fondouce, *Les Temps préhistoriques dans le sud-est de la France: Allées couvertes de la Provence* (Second Mémoire), 1878.

¹ e. g. by M. Cartailhac, Capt. Déchelette, and Prof. T. E. Peet.

² *Arles antique*, p. 8, pl. 1. Compare with this and the cover-stone of the Grotte de la Source the markings on the cover-stone of an *allée couverte* at Barranc, Espolla, in Catalonia, illustrated by Pericot, *Civil. Megal. Catalana*, pl. vi.

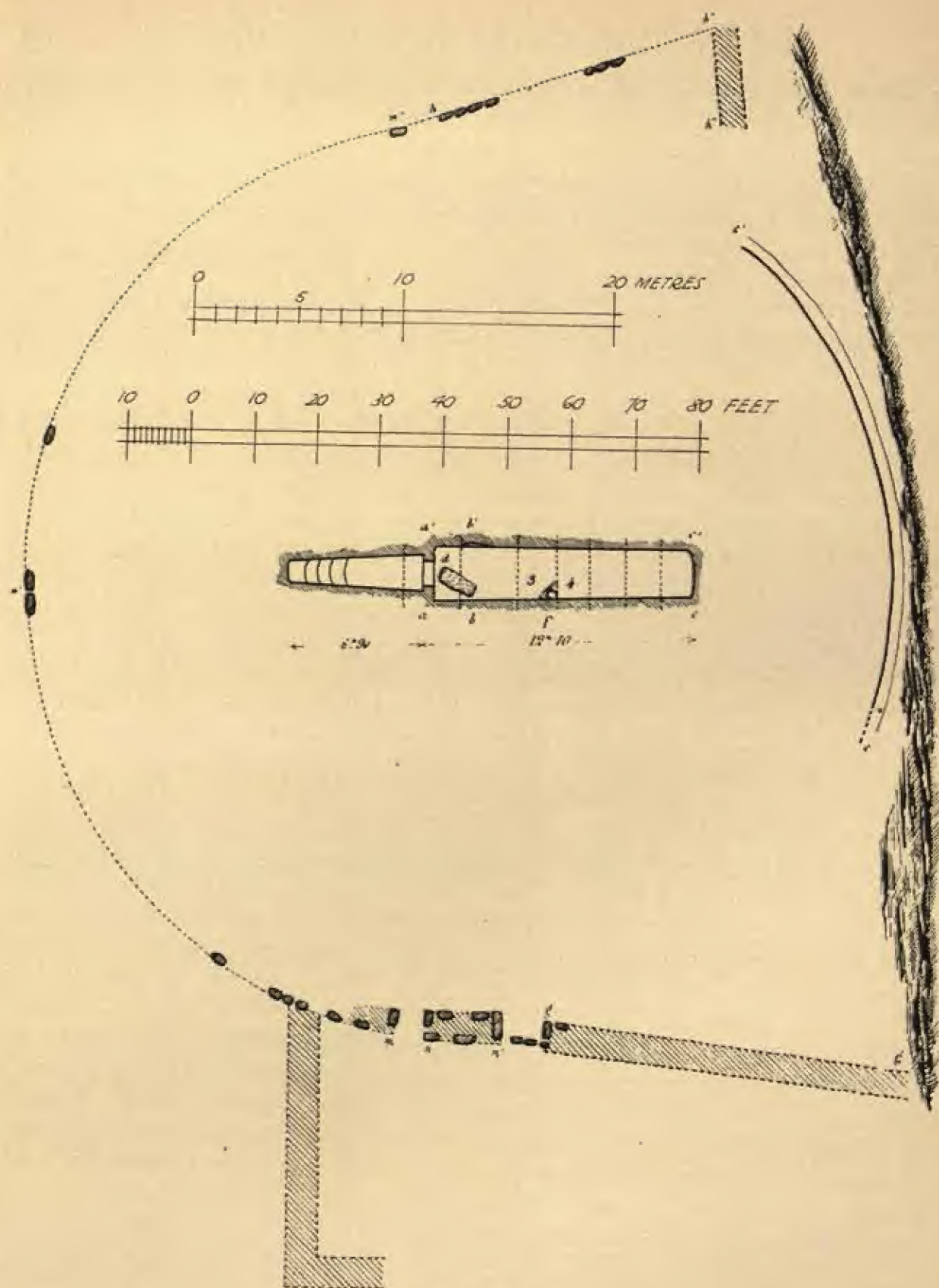
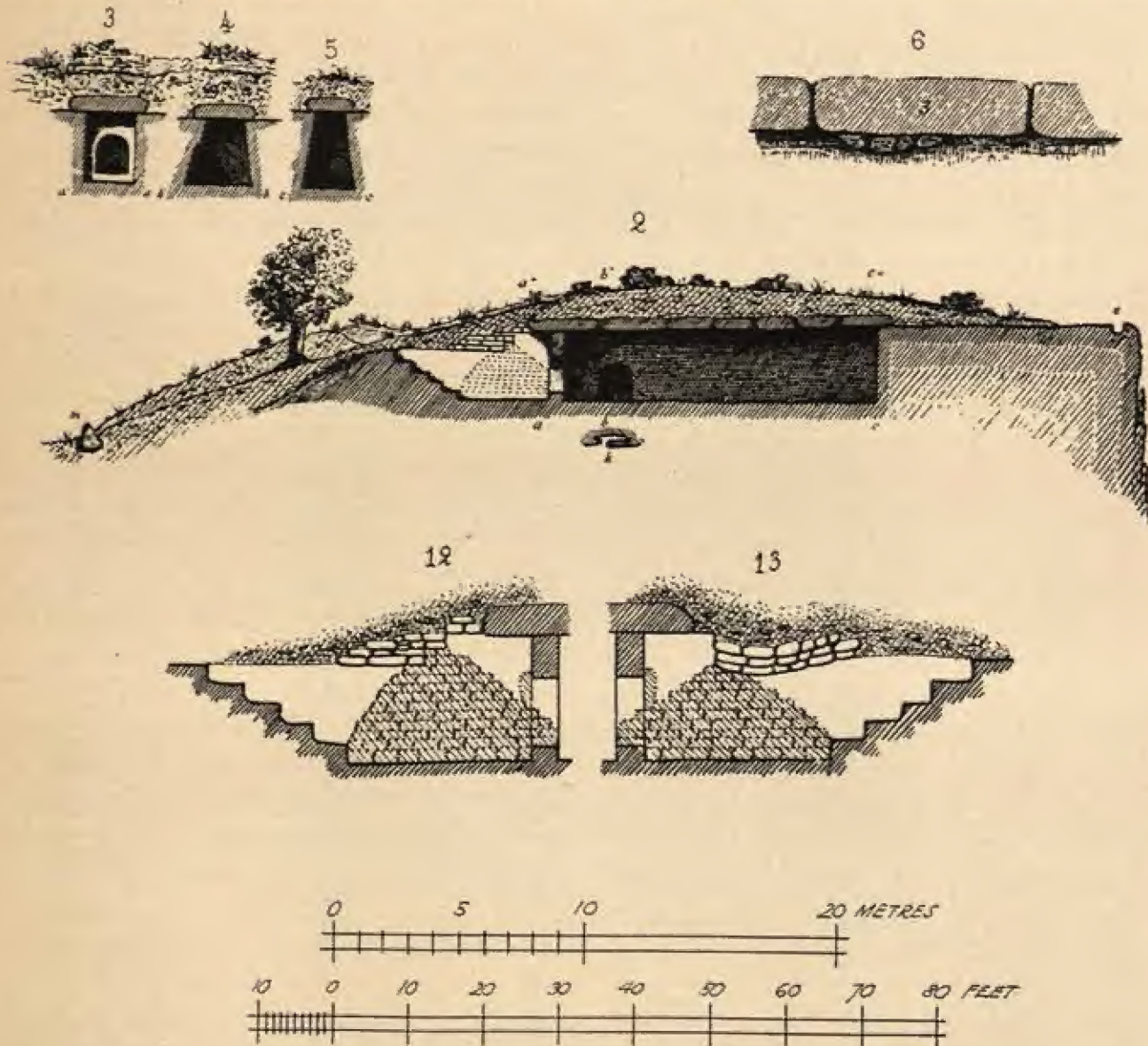


Fig. 17. La Grotte Bounias: plan.
 From *Mém. de l'Acad. de Montpellier (Sect. des Sciences)*, viii, pl. xii (with additions).

La Grotte Bounias is situated on a low hill 150 ft. high adjoining the Mont de Cordes. It has been fully described by M. Cazalis de Fondouce in the



DIAGRAMS Nos. 6, 12 & 13 ARE DRAWN TO APPROXIMATELY DOUBLE THIS SCALE

Fig. 18. *La Grotte Bounias*: sections.

From *Mém. de l'Acad. de Montpellier (Sect. des Sciences)*, viii, pls. xi, xii.

Mémoires de l'Académie des Sciences et Lettres de Montpellier.¹ Its features are recorded on the plan and section (figs. 17, 18) and show that it is essentially a deep trench cut in the rock and roofed by large slabs; cut in the surface of the rock is the trench to which reference was made in the description of the Son

¹ *Sciences*, tome viii, 1873.

Caulellas cave no. 14 (pl. xxiv, fig. 2). Where the rock surface dips downwards and is covered with soil, the place of the trench is taken by a dry stone wall with inner and outer faces which acts as a retaining wall, and holds up the soil to form an approximately level circular platform 135 ft. in diameter. The wall appears to have been about 5 ft. high at the lowest point opposite to the entrance to the *grotte*. The southern side of the platform is bounded by a straight length of wall-foundation more or less as shown in the plan. The original plan also indicated what appears to be an opening in the wall, but it did not record the existence of a stretch of foundation which begins at a point 17 ft. west of the entrance, runs southwards for 44 ft., and then turns eastwards and runs parallel to the wall-foundation bounding the platform for 15 ft. before dying away. There is no sign of a return. This wall-foundation has every appearance of being contemporary with the boundary wall, and seems to have formed a courtyard covering the approach to the platform. It has been added to the plan as reproduced here.

It is possible that the upright stones which were placed in the trench—some still remain *in situ*—formed a sector of a circle which was continued on the western side by a wall rising above the platform level to a height to correspond with that of the uprights.

Had the uprights themselves served as a retaining wall to a mound or platform of earth there would probably be some evidence of the displaced material, as the rock in the neighbourhood of the trench is practically bare; there is, however, nothing to suggest that any essential change has taken place since the soil was levelled up behind the wall. It is probably not without significance that at a point in the platform area just inside the opening in the boundary wall and remote from the entrance to the *grotte*, many fragments of pottery have been exposed by a modern trench. The soil containing this pottery could not have been removed from the entrance to the cave when this was cleared, and the material so moved still remains about the entrance; it also contains fragments of pottery, made from exactly similar clay and containing mica, apparently of the Bronze Age. There is nothing now to show whether there was any indication of the entrance on the surface of the platform. The upper part of each side of the stairway is made up in dry masonry where the rock fails, and M. de Fondouce makes it clear that the area at the foot of the stair and in front of the entrance to the *grotte* was occupied by a carefully built pile of stones which supported a single block of considerable size, the two together effectually closing the entrance (fig. 18). Presumably the stairway was filled with earth. In any case there is no suggestion that it was roofed with stone slabs, although where the rock fails the sides are built up of squared stones.

Inside the chamber was found a layer of earth covering one of white quartz, and on it one complete skeleton in the centre, and bones from about ten individuals. There were also a bronze dagger, four leaf-shaped flint arrow-heads, a cylindrical bead of bone or stone scored round with grooves, another

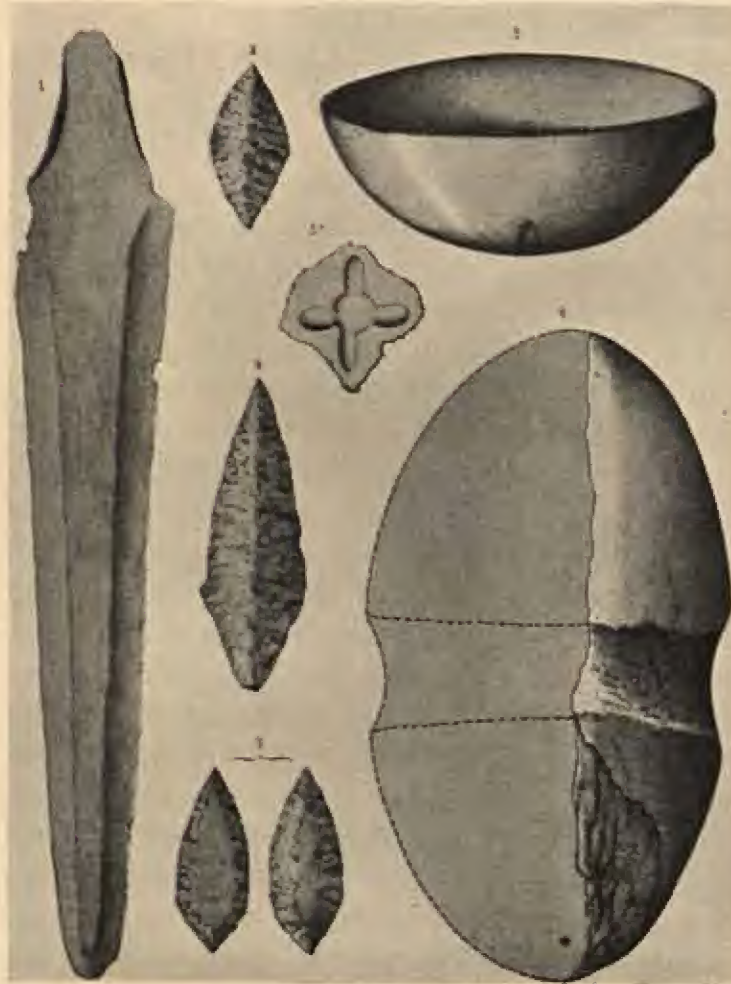


Fig. 19. Objects from La Grotte Bounias (about $\frac{1}{2}$).
From *Mém. de l'Acad. de Montpellier (Sect. des Sciences)*, viii, pl. xiii.

plain cylindrical greenstone bead, a bone button with V-perforation, and part of a quartzite hammer (fig. 19), together with many rounded water-worn pebbles of white quartz. These, as M. Cazalis de Fondouce points out, must have been brought from a distance, the local quartz being red. One point which he does not note is that many of the pebbles have been broken. There are several British analogies to this use of broken pebbles of white quartz in connexion with megalithic monuments. The innermost angles of the chamber are treated as are those of the Grotte des Fées.

La Grotte de la Source is on the same hill as *La Grotte Bounias*, and is separated from it by a small valley. It is very similar in type. The exposure of the cover-stones reveals the fact that on one of them there are several 'cups' and other engraved markings, including the one already referred to in dealing with the cups and rings in the Mallorcan cave no. 7 (fig. 4). In the material thrown out from the interior and now lying about the entrance are fragments of the usual pottery and pieces of white quartz.

There is clear evidence here also of a circular platform of about the same diameter as that covering *La Grotte Bounias*. It is 1 ft. 6 in. high where best preserved, and it seems to have had a smaller and concentric one placed upon it. This inner platform appears to have been about a foot high, and where it is still traceable the circumference lies about 12 yds. within that of the larger one. The finds as arranged in the museum at Arles include one leaf-shaped and one barbed and tanged arrow-head of flint, a miniature axe, and nine cylindrical beads; there was also an olive-shaped bead of red bronze or copper.

The fourth cave is that known as *La Grotte Arnaud* (or *Castellet*) on the same hill, but at a point where it sinks down into the marsh. This again has been described at length.¹ The features which chiefly distinguish it from its neighbours are a series of shallow transverse trenches cut in the rock floor, and a number of basins in the floor close to the wall, similar to those in *La Grotte des Fées*. There are, however, six—not five as recorded by the excavators. They were covered by earth, as was the rest of the floor of the cave, and in one of them was found a quantity of beads sufficient to form a necklace. Here again there was a 'tumulus' or platform, but its shape is not recorded, and the site is now so overgrown that examination is impossible. The contents included bones of at least 108 persons, a bed of quartz, 33 flint arrow-heads, one of them fixed in a human vertebra, a small celt of green porphyry, 113 beads of callaïs, one of copper and one of gold, over an inch long, a thin band of gold of about the same length, and fragments of bell-beakers.² Here also the innermost angles are slightly fluted.

The fifth tomb, *Contignargue*, differs considerably from its neighbours.³ The sides are built of squared stones, the roof of large slabs tapered slightly, and one end was closed by a large upright stone. By its side there now lies a statue-menhir, a long block of stone, one end of which has been carved into some resemblance to a human head, below which is the representation of a collar. The hands are also represented. In the tomb were found arrow-heads of flint, and beads, some of which were of callaïs.

¹ *Arles antique*, p. 12.

² *Arles antique*, p. 17.

³ Pericot, *Civil. Megal. Catalana*, p. 143, figs. 33 and 34.

The Marne Caves.

A brief reference must be made to another French parallel to the Mallorcan caves, namely, the burial caves in the Petit Morin Valley in the Marne area near Paris, and the closely allied cists in the same neighbourhood.¹ These caves are cut in the chalk, and bear a very close resemblance to some of the Mallorcan examples, in their vestibules and entrances, and the method of closing these last. One feature which distinguishes the Petit Morin group is the presence in some instances of a representation of the funeral deity in the vestibule, placed in an alcove beside the doorway; this is a link with the *allée couverte* of Coutignargue. Another resemblance to Mallorca is the disposition of the bodies, head to foot;² there is, however, little or no similarity in the pottery from the two sites.

SUMMARY

The Mallorcan caves are of two types, long and roughly circular, intended for inhumation and occupation respectively.

Both types are sometimes furnished with courtyards, and usually have a single or double vestibule. In some cases the vestibule contains a stair; if so, it was filled with stones and earth to seal the cave or else covered by a single stone. In one case a 'long-barrow' was erected above the monument, covering the entrance and the approximate position of the cave. The incurved approach to another cave is strongly reminiscent of the entrance to a long-barrow.

The burial-caves are usually provided with one or more side-chambers, and an end one is often present in a rudimentary form.

The main chamber was partly filled with earth in which the bodies were laid at length in layers with pottery, vessels arranged beside them. In the side-chambers were crouched skeletons.

The grave furniture consisted of pottery, showing close affinity to that of El Argar, bronze or copper knife-daggers and awls, buttons with V-shaped perforation, and pierced shells, all of which can be paralleled from El Argar. In one case at least the vessels were used to hold small human bones, shells, &c.

On published evidence, and making allowance for the apparent isolation of the culture, the central date should be placed at about 2000 B.C.; but there is some reason to think that one of about 1500 B.C. may have to be accepted.

The origin of the civilization which produced the caves has yet to be determined. The closest structural parallels are to be found in Provence, but

¹ Déchelette, *Manuel*, i, 455.

² Mr. T. D. Kendrick in *The Axe Age* (pp. 56-63) has emphasized the significance of these Marne monuments in relation to certain British megalithic graves.

Sardinia, Sicily, and the eastern Mediterranean are more probable sources, and the Portuguese rock-cut tombs at Palmella have certain similarities; while the grave furniture has definite affinities with the culture of south-east Spain.

There is some evidence, although at present inconclusive, to connect the caves with the monuments known as talayots; it is at least possible that their period overlapped the first stage of the culture which produced these strongholds.

NOTE

Señor J. Colominas Roca in an article on the Bronze Age of the culture of the talayots in Mallorca¹ has divided the era into three periods: A, the first age of bronze, markedly influenced by the culture of El Argar; B, the fully developed culture of the talayots; C, the Romanized culture of the talayots.

He has provided a list and illustrations of the principal finds of bronze tools and weapons in Mallorca. The following table of knife-daggers from the caves is supplemental:

LIST OF KNIFE-DAGGERS FOUND IN MALLORCAN CAVES

No.	Place.	Find Spot.	Associated Finds.	Reference.	Composition, etc.
1	Son Mulet, near Lluchmajor.	Burial-cave.	Bronze awls, V-button, lead disc, skeletons, pottery, shells.	Above, fig. 7.	4 rivets, copper or bronze.
2	Son Jaumell, near Artá.	" "	Bronze awl, V-button, skeletons, pottery, shells.	<i>Correo de Mallorca</i> , 23rd April 1927.	4 rivets.
3	Son Mari, near Santa Margarita.	Passage connecting habitation cave and talayot.		Above, fig. 14.	3 rivets, copper or bronze.
4	Cova de Vernissa, near Santa Margarita.	Natural cave used for burials.	Skeletons and pottery.	<i>Anuari de l'Institut d'Estudis Catalans</i> , vi, fig. 260, p. 558.	3 rivets, copper 92.03, tin 5.05, lead 1.08.
5	La Mola, near Felanitx.	Burial-cave.	Pottery and human bones.	<i>Anuari</i> , vi, p. 561.	Resembles no. 4.

¹ *Butlletí de l'Associació Catalana*, i, 88.

VII.—*The Bosses on the Vault of the Quire of Winchester Cathedral.*
By C. J. P. CAVE, Esq., M.A.

Read 26th November 1925

THE internal vaulted roof of the presbytery of Winchester Cathedral is ornamented with a series of ninety-seven carved wooden bosses (pl. xxvi). They are not only interesting in themselves, but they are thought to throw some light on the date of the roof itself. In any case they are worthy of careful study.

They are all highly coloured and gilt. Milner, writing before 1809,¹ speaks of them as being 'richly painted and gilt in the highest preservation', and mentions the 'original perfection and freshness which they have retained during almost three centuries'. But certain repairs were done to the roof in 1819, and some repainting of the bosses seems to have occurred. At the chapter held in November 1818 it was ordered 'that such repairs in the wood-work of the ceiling as Mr. Garbett shall ascertain to be necessary to be done over the choir be also proceeded in'.² In the Chapter Record book, which was begun in 1813, there are notes of previous work, and under the year 1827 is a note, 'the bosses of the choir ceiling were recoloured', and a reference is given to the *Gentleman's Magazine*. In the volume for 1828³ we find 'the recolouring of the bosses of the choir ceiling, with their curious and interesting devices . . . may conclude the summary of the renovations which have been effected', but the summary alluded to is of work that had been done in the previous sixteen years, which was concluded in 1828. The repainting must have been done in 1819, for in the *Gentleman's Magazine* for that year⁴ is a letter dated July 18th, which speaks of the quire being occupied by workmen, so that service had to be held in the Lady Chapel, and in another letter in the same volume⁵ it is stated that on the part of the roof 'between the stalls and the altar the workmen were employed when I saw it on Saturday, August 21st, and were doing the whole of it to imitate stone.' Traces of this imitation of stonework may still be seen all over the roof. Immediately over one of the windows on the north side is a boss representing a pelican; it is not on a shield, but has

¹ *History and Survey of Winchester*, 2nd ed., 1809, vol. ii, p. 45.

² Extract from Cathedral Archives kindly made by Canon A. W. Goodman, F.S.A.

³ Vol. xcvi, pt. ii, p. 312.

⁴ Vol. lxxxix, pt. ii, p. 29.

⁵ p. 305.

a scroll about it with the lettering A M EST DEO GRATS 1819 (pl. xxxv, fig. 6). I think that this shows that the repainting was done in that year. I have not ascertained what the initials A M refer to; the inscription is of course intended for the motto of Bishop Fox, EST DEO GRACIA, which appears many times in the windows, but on the boss it is wrong grammatically, and can hardly have been painted in the sixteenth century. I am inclined to suspect that the whole of this boss is of the date 1819; its character does not seem to me to be in keeping with the other bosses, and it is fastened on in a different way, being supported by four nails driven in round its edge; there does not appear to be any pin through the roof as with the other bosses.

For purposes of reference I have numbered the bosses arbitrarily, beginning at the east end of the central line; the numbers run down this line, and then go to the east end of the next line on the north side, then to the corresponding line on the south side, and so on.

The scheme of the bosses is as follows: at the east end about a third of the whole roof is occupied by bosses bearing emblems of the Passion; further west about a third is occupied by royal arms and badges, and the remaining third at the west end by arms connected with Bishop Fox and the sees that he successively occupied. The important place given to Fox's arms shows that the bosses were undoubtedly made during his episcopate, 1501-28. But further light may be thrown on their date by boss 58 (pl. xxxiii, fig. 5), which bears the arms of the Prince of Wales, and boss 38 (pl. xxxii, fig. 7) with the arms of Katherine of Aragon. It has been assumed that these arms commemorate the marriage of Katherine of Aragon to Prince Arthur, 1501,¹ but this, I think, cannot be the case, for on boss 14 (pl. xxxi, fig. 8) are the initials H K joined by a cord. That the first letter is intended for an H is, I think, certain; it is not formed in the same way as the H on boss 16 (pl. xxxii, fig. 1), but in the windows in King's College Chapel, Cambridge, there are examples of letters which are undoubtedly meant for the letter H which are formed in exactly the same way as the first letter on boss 14. Incidentally the direction of the work of glazing the windows at King's College was entrusted to Bishop Fox.² A consideration of the above-mentioned bosses shows, I think, that the bosses were put up between the year 1503, when a dispensation was granted by Pope Julius II for the marriage of Henry and Katherine, and 1509, when Henry VII died and Henry VIII married Katherine; the arms of the Prince of Wales would therefore refer to Henry and not to Arthur; Henry was created

¹ Dean Kitchin, quoted by E. C. Batten in the *Register of Bishop Fox*, p. 67; also the *V.C.H., Hants*, vol. v, p. 56, where it is stated that on one of the bosses are to be found the arms of 'Prince Arthur impaling the Royal Arms of Spain, which dates the work to about 1502.'

² Willis and Clark, *Architectural History of the University of Cambridge*, vol. i, p. 499.

Prince of Wales in 1503, and would have been entitled to use the label on the death of his elder brother in 1502.

But the date of the bosses is certainly subsequent to the date of the vaulting, for the coloured bosses have been placed on the top of other bosses which are contemporary with the roof. These earlier bosses may be seen round the edge of the later bosses in many cases, and in their entirety in some places where the later bosses have not been placed over them (pl. xxxv, fig. 7). The vaulting has been attributed to Bishop Fox, but only, I think, because his arms appear on the bosses and on the flying buttresses round the quire; but the bosses, as we have seen, are rather of the nature of an afterthought, and are no evidence of the date of the roof, while the flying buttresses are clearly later than the walls of the clerestory on which they abut.¹ In the work that is undoubtedly the work of Bishop Fox, the pelican and other of his favourite devices occur freely, but in the clerestory and in the vaulting of the quire they do not occur except where they are obviously later insertions; I think, therefore, we may conclude that these parts are anterior to Fox's episcopate. The only possible exceptions are the corbels under the vaulting, but I am inclined to think that these, too, are later insertions.

The bosses themselves are bolted through the wooden vaulting-ribs by long iron bolts; these pass through some blocks of wood above the roof, and are kept in place by thin iron wedges which pass through slots in the bolts. The smaller bosses have one bolt each, the larger two.

The shields are mostly of the nearly square type so frequent at this period. Many of them have the dexter edge slightly concave to the shield, and the sinister convex; some have the lower corners rounded, some have them pointed. A large number have the top and bottom edges turned over, the edge thus formed being often highly ornamented with a sort of filigree work of interlacing floral stems; some of the lower edges thus turned over are ornamented with trefoils, groups of three roundels, or nail-head pattern. A large number of the shields is *à bouche*.

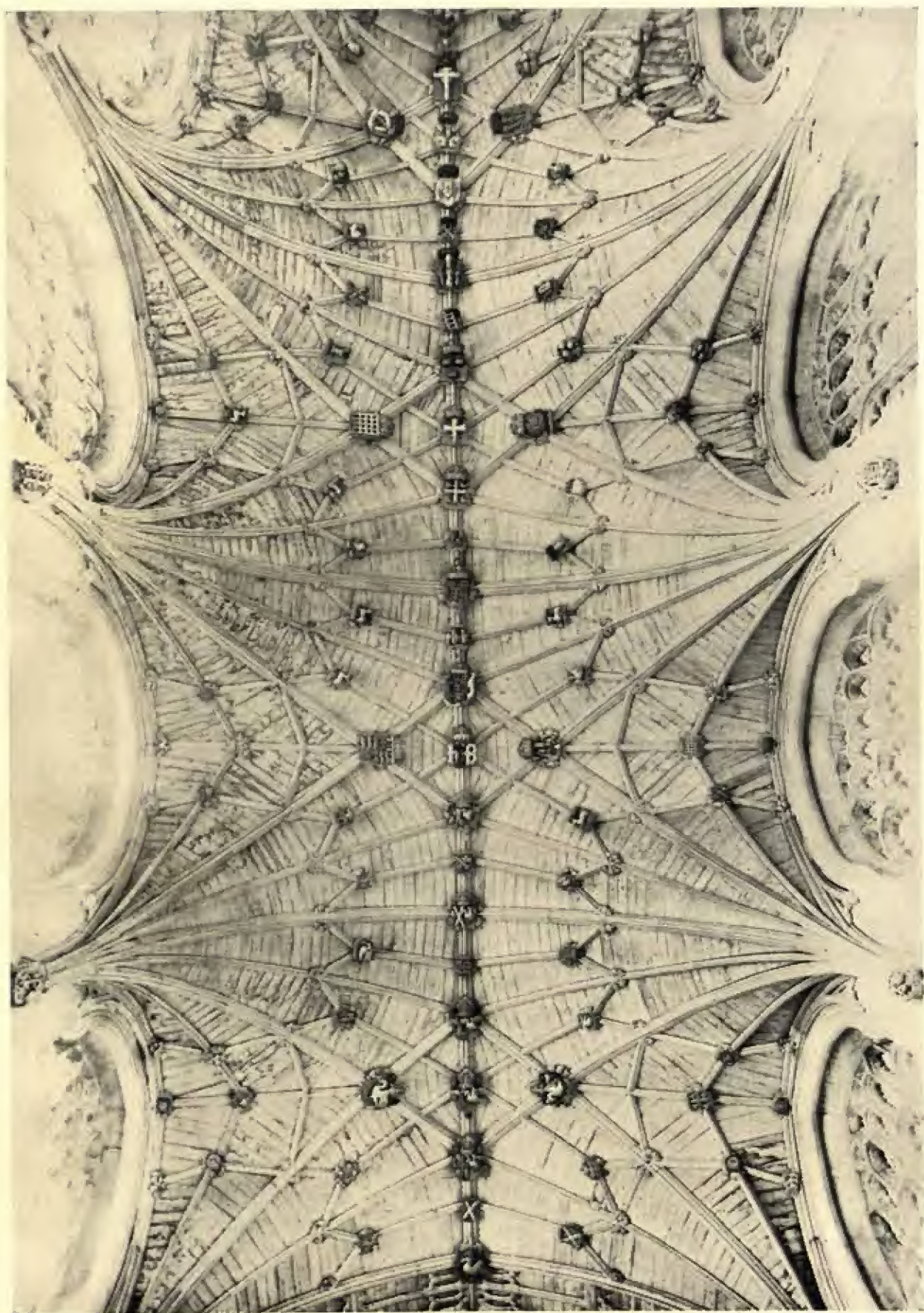
Interesting as the bosses are, there is something awkward in them in the positions they now occupy. The arrangement is also rather difficult to understand in some cases. How is it, for instance, that the arms of the see of Exeter impaling those of Fox occur twice in the large bosses on the central rib, and placed next to each other, while the more important arms of Durham and Winchester only occur once each in a similar prominent position? Except for the three main divisions there is a rather attractive irregularity in the arrangement of the bosses, very different for instance from the orderly arrangement in the quire of St. George's Chapel, Windsor.

¹ Willis, *Proceedings of the Archaeological Institute, Winchester*, 1845, p. 49.

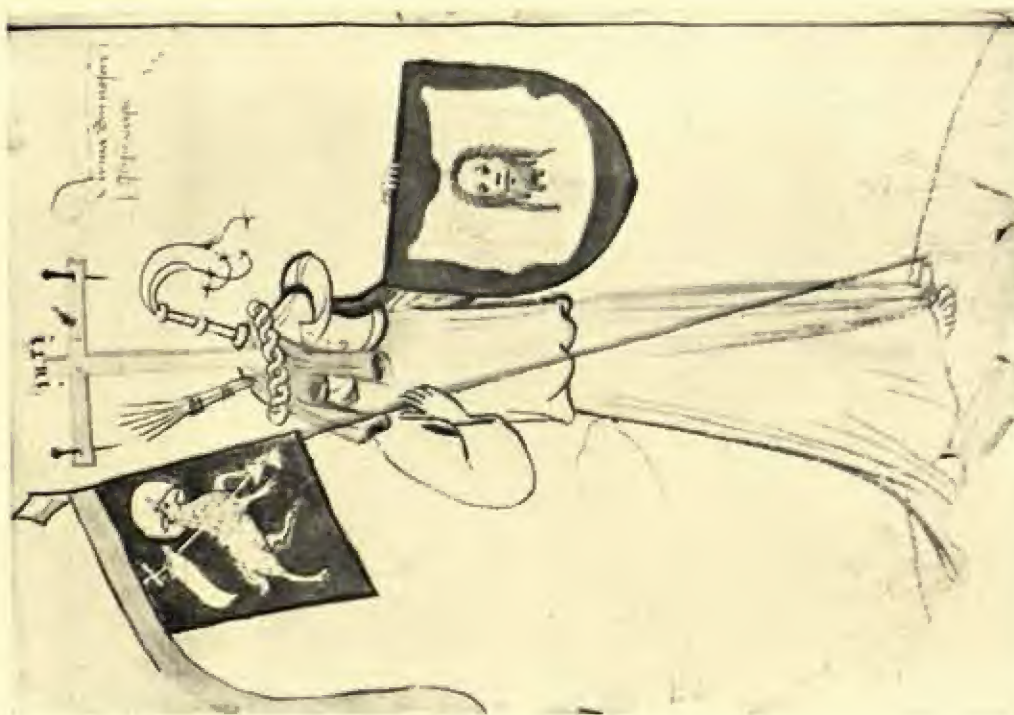
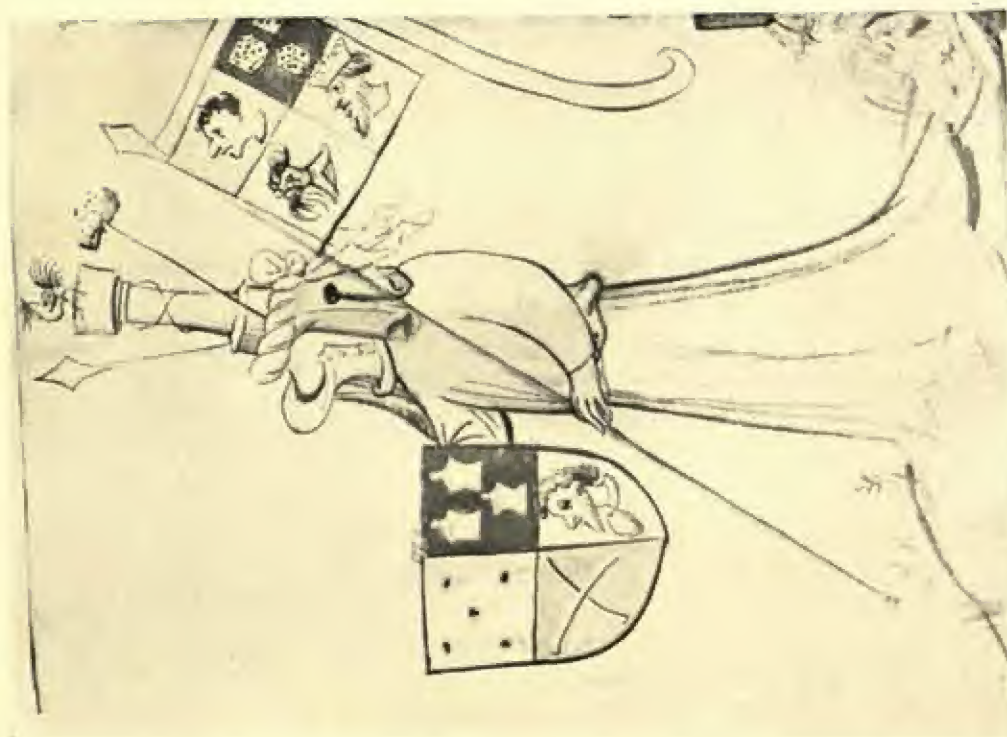
The following list of dates covers the life of Richard Fox:

- c. 1448. Birth of Richard Fox.
- 1457. Birth of Henry VII.
- 1484. Fox instituted to the vicarage of Stepney (30 Oct.).
- 1485. Letter dated 22 Jan. from the King to Bishop Kemp certifying that Fox was supporting the rebel Henry Tudor.
- 1485. Battle of Bosworth (22 Aug.).
- 1486. Henry VII married Princess Elizabeth, daughter of Edward IV (18 Jan.).
- 1486. Prince Arthur born (20 Sept.).
- 1487. Fox made Bishop of Exeter.
- 1491. Henry VIII born; baptized by Fox.
- 1492. Fox translated to Bath and Wells
- 1494. Fox translated to Durham.
- 1501. Katherine of Aragon arrived at Plymouth (2 Oct.).
- 1501. Fox translated to Winchester (17 Oct.).
- 1501. Prince Arthur married to Katherine of Aragon (14 Nov.).
- 1502. Prince Arthur died (2 April).
- 1503. Henry made Prince of Wales (18 Feb.).
- 1503. Dispensation by Julius II for marriage of Henry and Katherine (26 Dec.).
- 1505. Prince Henry protested that the contract of marriage made during his minority was against his mind and that he would not ratify it.
- 1509. Henry VII died (22 April).
- 1509. Henry VIII married Katherine of Aragon (11 June).
- 1509. Henry and Katherine crowned at Westminster (24 June).
- 1515-16. Fox founded Corpus Christi College, Oxford.
- 1516. Fox resigned the custody of the Privy Seal.
- 1528. Fox died (5 Oct.).

Perhaps some particulars may be added of the technical details of the photography, as they may be of use to others who want to photograph inaccessible details. The lens used was a Zeiss Tessar of 7.1 in. focal length, combined with a Ross telenegative lens of 2.25 in. focal length; the work was done with a uniform magnification of about six diameters. A tripod was used which enabled the camera to be swung back so as to point vertically upwards. The image of the bosses could not be seen on the ground-glass screen; a sighting telescope had therefore to be attached to the camera. A small hand electric lamp was placed on the floor at the same distance away from the camera as the roof was above it; the telescope was adjusted so that when the image was in the centre of the field of view it was also in the centre of the ground glass of the camera; the image on the ground glass was then focused accurately at the greatest aperture, $f/4.5$, after which the lens was stopped down, usually to $f/8$. After this no further adjustment was necessary for the rest of the day's work.



GENERAL VIEW OF THE QUIRE VAULT, WINCHESTER CATHEDRAL



Arma Domini Nostri Jesu Christi, from College of Arms MS, M 5, C. 1

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Published by the Society of Antiquaries of London, 1927

The front of the camera had, however, to be made very rigid, otherwise when the camera was pointed horizontally at the focusing light, the axis of the lens was not in exactly the same position, relatively to the telescope axis, as when the camera was pointed nearly vertically at the roof; the difference was quite enough at the high magnification used to throw the image of the boss off the plate. Accordingly a tilting table was used, which enabled the lens to be clamped tightly and prevented any lens-movement relatively to the back of the camera. These various refinements were only gradually evolved, and a number of plates were spoilt in the process. The photographs were all taken on panchromatic plates, and a colour filter was used, usually an Ilford β , but occasionally a Wratten K 3; very little difference was apparent between the two—probably the K 3 was slightly better for the particular subject, but it required a rather longer exposure. The exposure was about ten minutes on a bright sunny day in summer, but on dull days as much as three-quarters of an hour to an hour was necessary, and even then under-exposure might occur.

The height of the central rib of the vaulting above the floor of the quire (at the level of the floor where the two doors open from the quire aisles) is $75\frac{3}{4}$ ft., and above the floor at the altar, 74 ft.

The bosses vary from 1 ft. to 3 ft. in length. The following are the lengths of some of the bosses that were actually measured by means of a sextant: no. 3, 3 ft. 0 in.; no. 5, 2 ft. 10 in.; no. 7, 2 ft. 7 in.; no. 16, 2 ft. 7 in.; no. 17, 2 ft. 10 in.; no. 18, 1 ft. 5 in.; no. 19, 2 ft. 3 in.; no. 20, 1 ft. 3 in.; no. 21, 2 ft. 7 in.; no. 22, 2 ft. 7 in.; no. 23, 2 ft. 10 in.; no. 24, 1 ft. 10 in.; no. 25, 2 ft. 0 in.; no. 28, 2 ft. 10 in.; no. 30, 1 ft. 6 in.; no. 35, 1 ft. 4 in.; no. 36, 1 ft. 7 in.; no. 38, 2 ft. 10 in.; no. 41, 1 ft. 0 in.

DETAILED LIST OF THE BOSSES

The Passion Bosses

These are all found at the east end. The series is probably the best series of Passion emblems to be found in this country. In earlier examples Passion emblems appear on the altar in pictures of the Mass of St. Gregory, or on the background of the sky, as often in the pictures of the Image of Pity. Later on, however, they are placed upon shields often carried by angels, as in the stained glass at Malvern Abbey, and on the corbels under the quire vaulting at Winchester; they are in fact definitely *Arma Christi*. They are so treated on the quire bosses at Winchester, each emblem being placed on a shield. In a manuscript in the College of Arms¹ Passion emblems form part of the armorial bearings assigned to Christ under the title 'Arma Domini Nostri Jesu Christi' (pl. xxvii).

¹ M 5, f. 1.

On opposite pages are figures clad in white robes, one with bare feet; each wears a helmet with a crest, holds in one hand a shield, and in the other a spear which rests on the shoulder and carries a banner and standard; the first figure has the crown of thorns as a wreath and the seamless coat as mantling; the crest is a cross with a nail through each of the side arms, and a label bearing the letters INRI at the top; rising from the helmet on the dexter side of the cross is a bundle of rods, and on the sinister side a scourge; the shield bears azure a napkin argent with the head of Christ proper in front of a cross composed of drops of blood; the standard bears azure a lamb argent, with a gold halo, on which is a thin cross gules; the lamb is vulned in its breast with drops of blood falling into a gold chalice; there is a white staff with a gold cross whose foot rests in the chalice and which rests against the lamb's shoulder; from it depends a banner argent with a cross gules. The second figure has a white loin cloth as wreath and the seamless coat as mantling; the crest is a pillar silver with a cord wound round it; on the top is a cock; on the dexter side of the pillar is a spear, and on the sinister a reed with a sponge at the top, all proper; the shield held in the hand bears quarterly:

1. Silver the five wounds depicted as black spots bordered with red and dropping drops of blood.
2. Azure three covered pots gold.
3. Gules two staves in saltire gold.
4. Gold the head of Judas proper with red hair and red pointed beard; in dexter base a purse or money-bag.

The banner bears quarterly:

1. Gules a head proper, with black hair, spitting.
2. Azure three dice proper.
3. Gold a dexter hand holding a bundle of hair all proper.
4. The head of King Herod proper, crowned gold, the hair and beard being grey.

A similar drawing, but not coloured, is to be found in the British Museum,¹ and there are some later manuscripts² where Passion emblems are definitely treated as armorial bearings of Christ.

1. A pelican gold, with the crown of thorns behind it; there is no shield. The pelican, being the charge from Fox's arms, is here used as a Passion emblem. It is represented vulning itself, and not 'in its piety' (not illustrated).

2. Azure a chalice gold, the shield surmounted by a crown of thorns. Bradshaw considers that the chalice so frequently represented in Passion emblems

¹ Harl. 2169 [printed in the de Walden Library 1904; and see *Archaeologia*, vol. lxviii, p. 36].

² Harl. 1049, and Harl. 1977.

is the cup of the agony in the Garden (Luke xxii, 43) and not the chalice of the Last Supper, and in this I agree (pl. xxviii, fig. 2).

3. Gules a silver cross with three nails, surmounted by a label bearing the letters INRI; round the centre of the cross are rays in gold. The shield is surmounted by a crown of thorns (pl. xxviii, fig. 1).

4. Azure a silver cross with a heart over the central point, bleeding from a wound on the dexter side; in the upper quarters are hands couped, and in the lower feet couped, all showing marks of the nails; heart, hands, and feet are represented proper. The heart is very realistically represented with part of the aorta visible. The shield is surmounted by a crown of thorns (pl. xxviii, fig. 3).

5. Veronica's handkerchief in white with a border of gold on the outside, and an inner border of red; the face of Christ shown proper. The shield is surmounted by a crown of thorns (pl. xxviii, fig. 4).¹

6. Gules a hammer and pincers saltireways gold, the shield surmounted by a crown of thorns (pl. xxviii, fig. 5).

7. Gules a pillar painted to imitate marble; on the dexter side a rod composed of a bundle of white twigs, on the sinister a scourge with a gold handle and white thongs; a gold cord passes round the pillar, the rod, and the scourge. The shield is surmounted by a crown of thorns (pl. xxviii, fig. 6).

8. Gules a ladder in bend gold; the shield is surmounted by a crown of thorns (pl. xxviii, fig. 7).

25. A pelican gold, with the crown of thorns behind it; there is no shield (pl. xxviii, fig. 8). This boss is very similar to no. 1.

26. On a blue field a Jew's head proper, spitting; cf. Matt. xxvi, 67 (pl. xxviii, fig. 9).

27. On a blue field a dexter hand proper, with the palm outwards, with a sleeve which is yellow with purple lining; Matt. xxvi, 67 (pl. xxix, fig. 1).

28. Gules three nails with a cord twined about them all proper. The shield is surmounted by a crown of thorns (pl. xxix, fig. 2).

29. Azure a basin and ewer gold; Matt. xxvii, 24 (pl. xxix, fig. 3).

30. Azure the money-bag of Judas, of a dull red colour with gold fastenings, and silver coins dropping from it; Matt. xxvi, 14-15, and xxvii, 3-5 (pl. xxix, fig. 4).

¹ See M. R. James, *The Apocryphal New Testament*, p. 157.

31. Azure a lantern gold, within it a white candle with a red flame ; John xviii, 3 (pl. xxix, fig. 5).

32. Gules three dice proper ; John xix, 24 (pl. xxix, fig. 6).

46. Gules a hand proper holding a tress of dark brown hair ; sleeve pale yellow, with dark grey lining (pl. xxix, fig. 7). This emblem no doubt refers to the passage in Isaiah l, 6, 'I gave my back to the smiters, and my cheek to them that plucked off the hair.' This emblem occurs in various collections of Passion emblems, e.g. in stained glass in Malvern Abbey, on a bench end at Kilkhampston, Cornwall, and on a woodcut of the 'Image of Pity' inserted in the copy of William Caxton's *Directorium Sacerdotum* in the British Museum ;¹ also in the MS. in the College of Arms, noticed above.²

47. Azure head of the high priest proper, in a dark red closely-fitting cap, with a gold and jewelled band round the forehead (pl. xxix, fig. 9).

48. Azure a lance in bend, point in chief, and a reed bearing a sponge in bend sinister, a loin cloth entwining them all proper. The shield is surmounted by a crown of thorns (pl. xxix, fig. 8).

49. The Kiss of Judas ; azure on the dexter side the head of Christ proper with light hair and beard, on the sinister the head of Judas proper with dark hair and beard (pl. xxx, fig. 1).

50. Azure a cock gold, wattled gules (pl. xxx, fig. 2).

51. Azure a torch gold in bend, over it a brazier gold, with wooden handle in bend sinister ; John xviii, 3, and for the brazier perhaps John xviii, 18 (pl. xxx, fig. 3).

52. Azure a pestle and mortar gold (pl. xxx, fig. 4). Perhaps the vessel for the wine mingled with myrrh (Mark xv, 23). It is so described by Bradshaw.³

66. Azure ; on the dexter side the head and shoulders of a man, in a blue vest, and a red outer coat with gold facings ; hair, beard, and moustache dark brown ; on the sinister side the head of a woman with a white wimple and a gold headband. These heads probably represent Pilate and his wife. It has been suggested that they may be St. Peter and the maidservant, but I think the colours on the dress of the male figure make the first explanation the more probable (pl. xxx, fig. 5).

¹ See Henry Bradshaw Society publications, vol. xxii, pp. 647, 657, and pl. 1.

² Coll. of Arms MS., M 5, f. 1.

³ Henry Bradshaw Society publications, vol. xxii, p. 657.



Fig. 1. Boss 3 (p. 167)



Fig. 2. Boss 2 (p. 166)



Fig. 3. Boss 4 (p. 167)



Fig. 4. Boss 5 (p. 167)



Fig. 5. Boss 6 (p. 167)



Fig. 6. Boss 7 (p. 167)



Fig. 7. Boss 8 (p. 167)



Fig. 8. Boss 25 (p. 167)



Fig. 9. Boss 26 (p. 167)

PASSION BOSSES



Fig. 1. Boss 27 (p. 167)



Fig. 2. Boss 28 (p. 167)



Fig. 3. Boss 29 (p. 167)



Fig. 4. Boss 30 (p. 167)



Fig. 5. Boss 31 (p. 168)



Fig. 6. Boss 32 (p. 168)



Fig. 7. Boss 46 (p. 168)



Fig. 8. Boss 48 (p. 168)



Fig. 9. Boss 47 (p. 168)

PASSION BOSSES



Fig. 1. Boss 49 (p. 168)



Fig. 2. Boss 50 (p. 168)



Fig. 3. Boss 51 (p. 168)



Fig. 4. Boss 52 (p. 168)



Fig. 5. Boss 66 (p. 168)



Fig. 6. Boss 67 (p. 169)



Fig. 7. Boss 68 (p. 169)



Fig. 8. Boss 69 (p. 169)



Fig. 9. Boss 78 (p. 169)

PASSION BOSSES



Fig. 1. Boss 79 (p. 169)



Fig. 2. Boss 9 (p. 169)



Fig. 3. Boss 80 (p. 169)



Fig. 4. Boss 10 (p. 170)



Fig. 5. Boss 11 (p. 170)



Fig. 6. Boss 12 (p. 170)



Fig. 7. Boss 13 (p. 170)



Fig. 8. Boss 14 (p. 170)

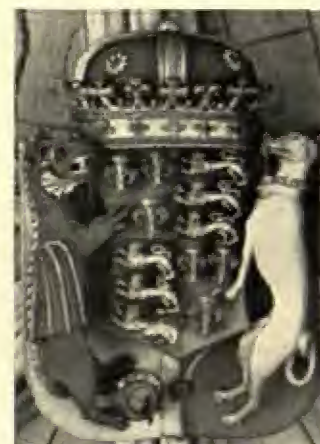


Fig. 9. Boss 15 (p. 171)

PASSION AND ROYAL BOSSES

67. Azure the head of Malchus proper, with a sword severing his left ear; the blade of the sword is steel coloured; the hilt the colour of wood; while the pommel and cross-piece are gold (pl. xxx, fig. 6).

68. Gules two bundles of twigs saltireways, one brown, the other white (pl. xxx, fig. 7).

69. Azure three pots of spices gold (pl. xxx, fig. 8). There is no doubt, I think, that the three pots refer to Mark xvi, 1. They are so interpreted by Bradshaw¹ and by Émile Mâle.² They occur as a quartering in the Arma Domini Nostri Jesu Christi.³ In a picture of the three women at the sepulchre by Andrea Orcagna, Tuscan School, 1308-68, in the National Gallery (no. 576) each woman carries a covered pot.

78. Gules two scourges with knotted thongs saltireways gold (pl. xxx, fig. 9).

79. Azure the seamless coat of Christ gules, collar and cuffs gold (pl. xxxi, fig. 1).

80. Gules two staves saltireways in the colour of natural wood; Matt. xxvi, 47 (pl. xxxi, fig. 3).

The Royal Bosses

These are placed in the central part of the roof. Several of them have definite coats of arms represented on them, but the majority of them bear Royal badges placed on a shield. The dividing of the field of the shield per pale or per fess in numbers 36, 70, and especially 15, calls to mind the standards in the Book of Standards⁴ with the badges placed upon them; there is no doubt that the majority of the Royal bosses bear not coats of arms but badges placed upon shields in the same way that they used to be placed upon Standards. Several of the badges are not placed on shields—the two sunbursts, the roses, the fleurs-de-lis (except the crowned one), one of the Welsh dragons, and one of the portcullises.

9. Azure three crowns two and one, gold, their inner sides gules; the shield is surmounted by a crown (pl. xxxi, fig. 2). These arms may be intended for a number of 'Saxon kings after the Romans';⁵ on the whole the most likely is perhaps St. Edmund, King and Martyr.⁶ It has been suggested that these

¹ Henry Bradshaw Society, vol. xxii, p. 658.

² Émile Mâle, *L'Art religieux de la Fin du Moyen Âge en France*, 1908, p. 97.

³ Coll. of Arms MS., M 5, f. 1.

⁴ Coll. of Arms MS., I 2.

⁵ Coll. of Arms MS., Vincent 172, f. 12.

⁶ Coll. of Arms MS., M 3, f. 73.

arms might be intended for King Arthur, but the arms usually attributed to him had the three crowns in pale, or another coat was vert a cross silver, in dexter chief the Virgin Mary gold.¹

10. Gules a cross patty fitchy gold; the shield is surmounted by a crown (pl. xxxi, fig. 4). This cross, but with a field azure, is very commonly attributed to Caedwalader, and appears in very many manuscripts which give the arms attributed to British and Saxon kings.² I have not been able to find these arms with a red field as the arms of a king, as these obviously are, but I think that the arms are probably intended for those attributed to Caedwalader, reputed to be a saint, from whom Henry VII claimed descent, and through whom he claimed the red dragon as a badge.³ Henry actually sent a commission to Wales to inquire into the ancestry of Owen Tudor.⁴

11. Azure a cross flory between four martlets gold. The shield is surmounted by a crown (pl. xxxi, fig. 5). These arms have been attributed to a great number of Saxon kings; in this case they might be meant for Edgar,⁵ who appointed Athelwold to the bishopric of Winchester and who had so much to do with the early history of the cathedral. They might also be intended for Edward the Martyr;⁶ if this were so, the three coats of arms 9, 10, and 11 would all commemorate kings who were also deemed to be saints. This shield cannot be meant for Edward the Confessor, whose arms always had a fifth martlet at the foot of the cross; it might be thought that on this shield there had been a fifth martlet which had become detached, but I am satisfied that the mark below the foot of the cross is the end of the peg by which the boss is attached to the roof.

12. The arms of France, azure three fleurs-de-lis gold (pl. xxxi, fig. 6).

13. Quarterly France and England; the shield is encircled by the garter, and surmounted by a crown (pl. xxxi, fig. 7).

14. Azure the initials H K gold; the letters are joined by a looped cord (pl. xxxi, fig. 8).⁷

¹ Coll. of Arms MSS., I 2, f. 7; L 14, pt. i, f. 366, &c.

² Harl. 1506, f. 8; Coll. of Arms MS., I 2, f. 3, &c.

³ There seems to have been much confusion between Caedwalader, the supposed last king of the Britons, and Caedwalla, the Saxon king of Wessex; both have the same arms attributed to them, though the latter is sometimes given the arms of Edward the Confessor; Eg. 2874, f. 6.

⁴ Caradoc of Llancarvan, *History of Wales*, Englished by Powell, Wynne's edition, 1774, p. 331.

⁵ Coll. of Arms MS., M 3, f. 73, &c.

⁶ Harl. 1392, f. 14; Coll. of Arms MS., Prince Arthur's Book, &c.

⁷ See above (p. 162) for the letters on this boss.

15. Quarterly France and England; the shield is surmounted by a crown and has supporters; on the dexter side a red dragon with gold stripes on its wings and a gold line down its back; there are other gold marks on its head and tail; on the sinister side a white greyhound collared gold (pl. xxxi, fig. 9). The red dragon is evidently the dragon of Wales, and the other supporter the white greyhound of the house of Beaufort. The shield and supporters are placed on another shield per pale argent and sable.

16. A blue green field with a green hawthorn bush bearing white flowers with a darker centre; on the dexter side is the letter H and on the sinister the letter R, both silver; part of the letter H is formed by a wyvern; a gold cord passes round the stem of the hawthorn bush and round each letter. The hawthorn bush extends beyond the top of the shield and is surmounted by a crown (pl. xxxii, fig. 1).

33. Azure a rose gules with centre gold; the shield is surmounted by a crown (pl. xxxii, fig. 3).

34. Rays of the sun gold, issuing from a cloud azure and gold. This badge is not placed on a shield (pl. xxxii, fig. 2). The 'sunburst' is found as a badge of Edward III¹ and subsequent kings.

35. Azure a vase gold, issuing therefrom a plant of a dull green with dull red flowers which somewhat resemble carnations (pl. xxxii, fig. 4). In a manuscript in the College of Arms² a very similar badge appears on the armorial achievement of Henry VIII and Anne Bullen; on the sinister side is the badge of the queen, and the one on the dexter side is obviously the king's; the vase is silver and the flowers alternately red and white. On the roof of St. George's Chapel, Windsor, there are a number of rose plants depicted bearing red and white roses, denoting no doubt the union of the houses of Lancaster and York; but the flower in the vase is also given in the above-mentioned manuscript³ as the badge of Henry Somerset, earl of Worcester, whose father was an illegitimate son of Henry Beaufort, duke of Somerset. The same badge is also mentioned⁴ as belonging to 'Somerset and Herbert from antiquity'. It may therefore be that it was a Beaufort badge which came to the Tudors through the mother of Henry VII. Such at any rate seems the most likely supposition pending further evidence.

36. Per pale sable and gules a white hart statant proper, chained gorge and antlered gold (pl. xxxii, fig. 5). The white hart was used as a supporter by

¹ Harl. 2076, f. 44, and Harl. 6085.

² Coll. of Arms MS., Vincent 172, f. 13.

³ *Loc. cit.*, f. 24.

⁴ Harl. 1073, ff. 86, 87.

Richard II.¹ The field of this shield is similar to that on several standards in the Book of Standards,² and I think the boss is meant to represent a badge on a standard rather than a charge on a shield of arms.

37. Gules a falcon gold with a maiden's head proper, the hair hanging over the shoulders (pl. xxxii, fig. 6). A very similar badge is given in a list of the badges worn by the duke of York,³ and is said to be a badge of cognizance of the castle of Coningsborough.

38. The arms of Katherine of Aragon: Quarterly of four grand quarters: I and IV, quarterly 1 and 4, gules a castle triple towered gold for Castile, 2 and 3 silver a lion rampant gules for Leon. II and III per pale, 1 gold four palets gules for Aragon, 2 per saltire in chief and base Aragon, in flanks silver an eagle displayed sable for Sicily. The shield is surmounted by a crown with arches but with no cap within the arches (pl. xxxii, fig. 7).

39. Azure a yale silver with sable spots (pl. xxxii, fig. 8). This is not a typical yale, but there are many ways in which the yale is depicted; the beast on this boss is something like the heraldic antelope but it has not the serrated horn of that animal. The tail, too, should be the tail of an elephant, but a yale used as a supporter to the arms of the duke of Somerset has a precisely similar tail to that of the beast on this boss;⁴ the latter, too, has a tusk which limits the choice to the yale and the heraldic antelope, and it certainly is not the antelope.

53. Azure a portcullis gold, with chains hanging on each side; the shield is surmounted by a crown (pl. xxxii, fig. 9).

54. Gules a lion statant, gardant, crowned with a royal crown, gold; the royal crest of England (pl. xxxiii, fig. 1).

55. Gules the stump of a tree eradicated gold (pl. xxxiii, fig. 2). This is a punning badge for the manor of Woodstock. It has been attributed to Edward III, in whose case it had two sprigs bearing green leaves (supposed to typify the king's flourishing issue);⁵ without the sprigs it has been attributed to Henry IV;⁶ it was used by his son John of Lancaster, duke of Bedford, 'from which circumstance it is called by the French "le racine de Bedford"':⁷

¹ Harl. 4632, f. 52; Coll. of Arms MS., I 2, f. 4.

² Coll. of Arms MS., I 2.

³ Harl. 4632, f. 236, and Bodleian, Digby 82, the latter quoted in *Archaeologia*, vol. xvii, p. 226. See also Planché, *The Pursuivant of Arms*, 3rd ed., p. 261 et seq.

⁴ Coll. of Arms MS., I 2, f. 6.

⁵ Harl. 1073, f. 8.

⁶ Harl. 2076, f. 44.

⁷ Planché, *The Pursuivant of Arms*, 3rd ed., p. 251.



Fig. 1. Boss 16 (p. 171)



Fig. 2. Boss 34 (p. 171)



Fig. 3. Boss 33 (p. 171)



Fig. 4. Boss 35 (p. 171)



Fig. 5. Boss 36 (p. 171)



Fig. 6. Boss 37 (p. 172)



Fig. 7. Boss 38 (p. 172)



Fig. 8. Boss 39 (p. 172)



Fig. 9. Boss 53 (p. 172)

ROYAL BOSSES



Fig. 1. Boss 54 (p. 172)



Fig. 2. Boss 55 (p. 172)



Fig. 3. Boss 56 (p. 173)



Fig. 4. Boss 59 (p. 173)



Fig. 5. Boss 58 (p. 173)



Fig. 6. Boss 70 (p. 173)



Fig. 7. Boss 73 (p. 173)



Fig. 8. Boss 92 (p. 174)



Fig. 9. Boss 82 (p. 173)

ROYAL BOSSES



Fig. 1. Boss 17 (p. 176)



Fig. 2. Boss 18 (p. 176)



Fig. 3. Boss 19 (p. 176)



Fig. 4. Boss 22 (p. 176)



Fig. 5. Boss 20 (p. 176)



Fig. 6. Boss 23 (p. 176)



Fig. 7. Boss 44 (p. 176)



Fig. 8. Boss 43 (p. 176)



Fig. 9. Boss 41 (p. 176)

THE BISHOP'S BOSSES



Fig. 1. Boss 45 (p. 176)



Fig. 2. Boss 61 (p. 176)



Fig. 3. Boss 64 (p. 177)



Fig. 4. Boss 65 (p. 177)



Fig. 5. Boss 88 (p. 177)



Fig. 6. Boss 91 (pp. 161, 177)



Fig. 7. Earlier Boss (p. 163)

THE BISHOP'S BOSSES

56. On a blue green field an antelope statant silver, collared, chained and tusked gold; it has tufts on its shoulder and haunch, coloured gold and dull green; its tail passes between its hind legs, across the near side, and ends, just behind the head, in a fork (pl. xxxiii, fig. 3). The tufts, the forked tail, the serrated horns, and the tusks distinguish the antelope from any other heraldic beast. Henry IV used the antelope as a badge¹ and as supporters to his arms.²

57. Gules a white hind (not illustrated). The white hind is attributed as a badge to Queen Philippa, the wife of Edward III.³ It is also mentioned as a Yorkist badge,⁴ 'that he beareth by the Fair Maid of Kent'. It is difficult to know why a badge of the Fair Maid of Kent should become a Yorkist badge, except that the Yorkists looked back with some favour to Richard II, who had named Roger Mortimer as his heir.

58. Quarterly France and England, over all a label of three points silver; the shield is surmounted by a crown with no arches (pl. xxxiii, fig. 5).⁵

59. Azure a fleur-de-lis gold, surmounted by a golden crown, which has a red cap but no arches (pl. xxxiii, fig. 4). Richard II used a fleur-de-lis as a badge,⁶ but Henry V is said to have been the first to use it surmounted by a crown.⁷

70. Per fess silver and azure, a dragon segreant gules with gold lines on wing and marks on head (pl. xxxiii, fig. 6). The dragon of Wales.

71. A rose gules with centre gold; not on a shield (not illustrated).

72. A fleur-de-lis gold; not on a shield (not illustrated).

73. A portcullis surmounted by a coronet gold; not on a shield (pl. xxxiii, fig. 7).

77. A rose outer petals red, inner white, centre gold; there is no shield (not illustrated).

81. Rays of the sun gold issuing from a cloud azure and gold;⁸ not on a shield (not illustrated).

82. Field a dull green, a white greyhound rampant with a darker coloured collar (pl. xxxiii, fig. 9).

¹ Harl. 6085.

² Harl. 4632, f. 238.

³ Coll. of Arms MS., L 14, f. 106.

⁴ Harl. 4632, f. 236, and Bodleian MS., Digby 82, the latter quoted in *Archaeologia*, vol. xvii, p. 227.

⁵ *Vide supra* (p. 162) for these arms and those of Katherine of Aragon.

⁶ Harl. 4632, f. 237.

⁷ Coll. of Arms MS., L 14, f. 380.

⁸ See boss no. 34, p. 171.

83. A fleur-de-lis gold; not on a shield (not illustrated).

84. A red rose with a gold centre; not on a shield (not illustrated).

85. Seven white feathers encircled by a gold and jewelled coronet; not on a shield. This device may be a Yorkist badge inherited by the house of York from the Mortimers. A seal of Edmund Mortimer shows as supporters two beasts with their heads covered with a helmet on which is a crest, a panache of feathers rising from a coronet.¹ The see of Durham also used a panache rising from a coronet; on the seal of Bishop Langley (1406-37),² the bishop is represented on horseback in armour, with no mitre, but for a crest a plume of feathers out of a coronet (not illustrated).

87. A fleur-de-lis gold; not on a shield (not illustrated).

89. A rose with the outer petals red, the inner white, and a red centre; not on a shield (not illustrated).

92. A red dragon represented in a crouching attitude with wings extended, head depressed, and tongue protruding. The feet are represented as holding on to a branch; on the back and wings are gold lines; not on a shield (pl. xxxiii, fig. 8).

96. A white greyhound, collared, represented in a crouching attitude as though about to spring; below the dog is a red rose with a gold centre; not on a shield (not illustrated).

97. A red rose with a gold centre; not on a shield (not illustrated).

The Bishop's Bosses.

The arms of Bishop Fox are represented on the bosses as azure a pelican gold vulned proper. There are, however, several variations of Fox's arms. Sometimes the pelican is represented in its piety, that is on its nest, feeding its young with its blood.³ Another variation has the pelican as on the bosses, but with a canton ermine;⁴ another is without the canton but with a border gold;⁵ and yet another has the canton and the border.⁶ On one of the coats of arms on the roof of St. George's Chapel, Windsor, the arms are given as in Winchester.

¹ Brit. Mus. Seal, lxxxviii, 33; see also Woodward, *Ecclesiastical Heraldry*, pp. 101, 102.

² Brit. Mus. Seal, liv, 88; *Archæologia*, vol. lxxii, pl. v.

³ Corpus Christi College, Oxford, in hall; St. George's Chapel, Windsor, boss at east end of quire vaulting.

⁴ Coll. of Arms MSS., Prince Arthur's Book, f. 156; M 3, f. 64.

⁵ Oxford Add. MS. 12443, quoted by Papworth, *Ordinary of British Armorial*, p. 317.

⁶ Coll. of Arms MS., L 8, ff. 69, 70.

The arms of the four sees successively held by Fox appear on a number of the bosses. The arms of the see of Exeter are represented as gules a sword erect in pale silver, the hilt in base gold, surmounted by two keys endorsed in saltire, the upper one in bend gold, the lower one in bend sinister silver. The arms of Exeter have a number of variations.¹ On bosses 24, 45, and 60 they appear as blazoned above, but on 65 the upper key, which is gold, is in bend sinister. In the east window both keys are gold, which is the most usual way of representing them. The arms of Bath and Wells appear as azure a saltire gold; these are probably the original arms of Wells, but in most cases the saltire is quarterly quartered gold and silver. Bishop Beckington (1443-65) used a saltire gold, and placed a pastoral staff behind it, two keys in dexter, and a sword in sinister flank; the two latter charges being from the original arms of the abbey of Bath.² The arms of Durham are azure a cross gold between four lions rampant silver; as represented on the bosses the cross has a ridge along the middle of each arm, making the charge something like a cross on a cross; in Fox's chantry a row of alternate trefoils and lozenges appears on the arms of the lower cross bordering the arms of the upper cross. The arms of Winchester on bosses 17 and 44 are gules two keys endorsed and conjoined at the bows in bend, the upper gold, the lower silver, between them a sword in bend sinister silver, hilt and pommel in base gold; on bosses 18, 62, and 74 the keys are in bend sinister and the sword in bend dexter. There are numerous examples of both variations in the carved work in the cathedral, and in various manuscripts. Woodward³ notices a shield in painted glass in the hall of New College, Oxford, with the charges of the arms of the see of Winchester, but with an azure field, and states that as far as he is aware it is unique; Baigent⁴ mentions the shield in New College, and also calls attention to a similar shield in one of the windows of the north side of the clerestory in the quire of Winchester, which has an azure field and a mitre in chief. Neither Woodward nor Baigent seem to have known that the arms with the azure field were those of the priory of Winchester. In two manuscripts in the College of Arms⁵ the arms of Winchester are given with both the gules and the azure fields, and in each case it is stated that the arms with the field gules belong to the bishop, and those with the field azure to the prior of Winchester. On boss 62, however, where in the flanks of the shield are the initials of Prior Thomas Silkestede, the field is gules.

¹ Woodward, *Ecclesiastical Heraldry*, p. 181.

² Woodward, *loc. cit.*, pp. 176 and 497; but Woodward is wrong in his recollection that the arms of Wells in the east window at Winchester are those generally in use: they are azure a saltire gold, as elsewhere in the cathedral.

³ *Loc. cit.*, p. 174.

⁴ Winchester Cathedral Library, Baigent MSS.

⁵ Coll. of Arms MSS., M 3, f. 64, and L 8, f. 65.

The mitres represented on these bosses are all azure and gold.

The personal arms of Bishop Fox are seen on two large bosses on each side of the central rib; along the central rib are large shields with the arms of Fox impaled with those of the four sees which he held; Exeter is twice given. On the smaller bosses the arms of Fox and those of the four sees are repeated.

17. Winchester impaling Fox; the shield is encircled by the garter and surmounted by a mitre (pl. xxxiv, fig. 1).

18. Winchester, the keys in bend sinister (pl. xxxiv, fig. 2).

19. Bath and Wells impaling Fox; the shield is surmounted by a mitre (pl. xxxiv, fig. 3).

20. Durham (pl. xxxiv, fig. 5).

21. Exeter impaling Fox; the shield is surmounted by a mitre (not illustrated).

22. Similar to no. 21 (pl. xxxiv, fig. 4).

23. Durham impaling Fox; the shield is surmounted by a mitre, the latter being encircled by a coronet, but having no panache (pl. xxxiv, fig. 6, and see no. 41).

24. Bath and Wells (not illustrated).

40. Fox (not illustrated).

41. A mitre of Durham gold and azure, encircled by a golden coronet and with a panache of eight silver feathers (pl. xxxiv, fig. 9).¹

42. Fox (not illustrated).

43. Fox; the shield is surmounted by a mitre (pl. xxxiv, fig. 8).

44. Winchester; keys in bend dexter (pl. xxxiv, fig. 7).

45. Bath and Wells (pl. xxxv, fig. 1).

60. Exeter (not illustrated).

61. Fox (pl. xxxv, fig. 2).

62. Winchester, with the keys in bend sinister. In the dexter flank is the letter T, and in the sinister the letter S, both gold; these are the initials of Thomas Silkested, Prior (not illustrated).

63. Fox; the shield is surmounted by a mitre (not illustrated).

¹ Brit. Mus. Seal, lxxxviii, 33, and Woodward, *Ecclesiastical Heraldry*, pp. 101, 102.

64. Durham (pl. xxxv, fig. 3).
65. Exeter (pl. xxxv, fig. 4).
74. Winchester ; keys in bend sinister (not illustrated).
75. Fox (not illustrated).
76. Durham (not illustrated).
86. Fox encircled by the garter (not illustrated).
88. Fox encircled by the garter (pl. xxxv, fig. 5).
90. Fox (not illustrated)

91. A pelican gold, vulned, with a scroll passing below and behind the figure, bearing in black letters on a white ground the inscription A M EST DEO GRATS 1819. One foot of the pelican is represented as passing through the scroll ; not on a shield (pl. xxxv, fig. 6).¹

93, 94, 95. A mitre azure and gold (not illustrated).

DISCUSSION

REV. E. E. DORLING congratulated the author on his paper and lantern slides, and had himself made notes on the Winchester bosses twenty years ago for publication. Their date was late, and some of the subjects were unique. The whole series was no doubt familiar to the devout in the middle of the sixteenth century, even the celestial heraldry of the Trinity, the Five Wounds, and Instruments of the Passion. As early as the reign of Edward III the arms of St. George were recognized, and such extravagances were sometimes regarded as a reproach to heraldry ; but, as Sir Hercules Read had remarked, such revelations of the mentality of past generations were useful to the antiquary. In the Pilgrimage of Grace a shield of the Five Wounds was carried on a ragged cloth banner. The symbols were placed on shields and must therefore be regarded as heraldic charges. On the MS. page thrown on the screen the flowers in the vase were not roses but carnations. The yale was, he thought, correctly identified, though its spots should have been larger ; and the three pots of ointment were the arms of St. Mary Magdalene. There were three red pots on a silver banner in a tapestry shown by Sir Hercules Read in 1917 (*Archæologia*, lxxviii, pl. vii) ; and he regarded the bunch of feathers in a crown to be a badge of the Prince of Wales, the three feathers having hardly been used till Stuart times.

MR. PEERS had found Mr. Dorling's notes on the bosses of great utility when preparing the article in the *Victoria County History of Hants*, and was glad to acknowledge his indebtedness. The paper was of more than usual interest, and made it clear that the roof was older than the bosses. The original structure seemed to have lasted down to the fourteenth century, and the apse on the east of it was rebuilt in the thirteenth, when an extension was made for the shrine of St. Swithun. There was an impulse in the next century to expand, and Bishop Edington (1345-66) was best known for his work at the west end of the nave. In the main lights were cusps about 1350, and there was reason to suppose that Edington built the presbytery to the roof ;

¹ See above (p. 161) for a note on this boss.

the main structure was his, though the tracery might be Bishop Fox's work. As in some other cases the intention was to add a stone vault, but wood was actually used. The bosses partly hidden by the shields were of good early fifteenth-century work, and had no connexion with the leaf-work of about 1470; and it was uncertain whether Wykeham or Beaufort finished Edington's roof and put up the formal bosses. Fox added the flying buttresses outside and between 1503 and 1509 started to decorate the interior. Mr. Cave's paper had furnished fresh evidence on that point.

DOM BEDE CAMM suggested that the figures called Pilate and his wife on one of the shields were Peter and the maidservant; and instead of carnations in the vase he thought marguerites more appropriate in connexion with the Lady Margaret, whose yale adorned the gateway of St. John's College, Cambridge.

MR. BARRON said that in view of the difficulty of seeing the bosses *in situ*, those present were the first to have a fair view of the series; and the paper showed what the antiquary's industry could do in co-operation with the proper instruments. He must refuse to discuss the yale, and could not say how large the spots should be; nor, considering the obscurity of the word, could he throw much light on the badges. The figures of the spitting Jew and of Pilate and his wife showed a carver with a bold hand, who wanted light and shade rather than colour, and he made the best of the shields, which were, however, concoctions. One bird of five had been omitted from a royal coat, and the three crowns were the arms of St. Edmund. King Arthur was not represented as a royal ancestor but as one of the three Christian worthies in the group of nine. He noticed that in every case the artist had represented a true sword, and had not fallen into the common error of making the keys a pair. He deprecated the use of the word *panache* for abushe of feathers. The shield of St. George as a knight in armour dated from the twelfth century: the fashion was followed with other saints and finally with pious objects, the last charges having an air of grossness compared with the fine heraldry of earlier times.

MR. CAVE replied that the Prince of Wales's feathers did occur in Fox's work in the aisles, which were a little later than the roof shields. He had looked up authorities and found a variety of arms assigned to King Arthur. Four martlets seemed always to be given to Saxon kings, but never to Edward the Confessor.

THE PRESIDENT would have liked to hear an impartial summing up of the paper and discussion, as there had been a Battle of the Styles. It was a great privilege to see the extraordinary series of bosses, and the Society would be pleased to express its thanks and appreciation to the author.

VIII—*Wall-Paintings in Croughton Church, Northamptonshire.* By E. W. TRISTRAM, Esq., F.S.A., and M. R. JAMES, Esq., Litt.D., F.S.A., Provost of Eton

Read 10th June 1926

I

BY E. W. TRISTRAM

ONE of the most remarkable periods in the history of English art is that which covers the closing years of the thirteenth and the opening years of the fourteenth centuries. This period is distinguished, among other evidences of intense artistic vitality, by the appearance of a group of illuminated manuscripts, some of which were produced by the famous East Anglian school of illuminators, while others had their origin in London. Their works bear the impress of their artists' contact with a busy world; they mark an advance upon their predecessors, not however because they cut themselves adrift from the 'hieratic' traditions maintained in the monastic houses, for at least another century had to pass before this finally occurred, but in their purely artistic qualities; they express swifter movement, show more vivid observation, and manifest a greater delight in all natural and human form. For a century or more English art had shown remarkable powers of growth: now it began to emerge from the cloister; artists and craftsmen congregated in centres, and they became forcing houses, as it were, of a new and luxuriant growth, which was peculiarly and essentially English without any immediate counterpart on the continent.

In the church of All Saints in the Northamptonshire village of Croughton was discovered in 1921 a series of wall-paintings, which belong to this school, and were executed about the year 1300 or during the early years of the fourteenth century. They make a remarkable contribution to our knowledge of this phase of English art, and add another important document to the history of the development of English painting.

As is usual before ancient wall-paintings are brought to light, several coats of whitewash had to be removed, together with some layers of mutilated paintings of later date. Apart from one or two pieces of pre-Reformation work, these consisted mainly of seventeenth and eighteenth century black-letter texts. The uncovering of the paintings was effected with considerably less damage

than is usual when this operation is attempted.¹ It is perhaps true to say that the majority of ancient wall-paintings which remain are little more than the silhouettes of subjects or give only a rough indication of their general composition. In consequence they often present to the uninitiated a grotesque and crude appearance which leads to an undeserved depreciation, since it is not realized that their original fine and delicate craftsmanship has been obliterated in the process of uncovering. Hence it is sometimes assumed that they are inferior to our illuminated manuscripts, embroideries, and stained-glass windows. But of late this misapprehension is fast disappearing before the body of evidence which is being accumulated by ever-fresh discoveries. It is becoming clear that English painting in the thirteenth and fourteenth centuries was a great and monumental art, and that, so far from falling short of the other arts, it was essentially one with, and on a level with, them. Moreover, it is acknowledged on the evidence of the East Anglian Psalters alone, that this country had something positive and constructive to contribute to the arts of the continent; and it may well be maintained that English painting likewise had something of its own to give. The discovery of the Croughton paintings is one more piece of evidence which goes to substantiate this.

The condition of these paintings, is, it is true, superior to the average, but it must not be supposed that it is by any means perfect. At first sight, it must be admitted, they present a somewhat damaged appearance. Most of the subjects require careful observation before it becomes apparent that they really contain much minute detail. Some have suffered but little damage during the six centuries of their existence, and stand out from the wall with considerable distinctness; but, on the other hand, there are others which are little more than clues, and require careful comparison with other documents to determine their nature.

The paintings, as they now exist, cover the north and south walls of the nave to within a few feet of the floor. With the exception of one or two isolated fragments they are all reproduced from water-colour drawings in the ensuing pages.² Those on the north wall depict in two tiers episodes in the Life of

¹ The removal of whitewash and other obliterations from the surface of ancient wall-paintings is a task fraught with many difficulties and one which sometimes can be done only imperfectly at best. Usually, however, it is undertaken by people with little or no experience, and what is of more importance without sufficient care. Considerable harm is frequently done, before it is realized how much paint has actually come away with the whitewash, and much of this could have been avoided if greater care and patience had been applied to the work. To uncover paintings of any extent successfully sometimes involves weeks of anxious labour.

² Experience has shown that, as a general rule, photographs of indistinct wall-paintings are of little value. Accidents of light and shade on an uneven surface, blemishes and other defects, which appear to be accentuated, tend to confuse the subject. On the other hand, it is possible for the copyist, viewing the wall from all angles and in all lights, to make it yield more of its secrets than the camera can reveal. And when some knowledge of what one might expect to find is added to extreme care

Christ from the Entry into Jerusalem, but the destruction of a certain number makes it impossible to determine what the last few subjects were. At the end of the lower tier, however, there is a group, the last two members of which represent St. Anne teaching the Virgin and the Annunciation, and appear to be out of their proper sequence. This is explained by the fact that the Lady altar originally stood at the east end of the north aisle, and these subjects must therefore be considered in their relation to the Lady Chapel. All that is left of another subject is a tall pot of flowers, and it is difficult to conjecture what it may represent, unless it be a figure of the Virgin seated between two pots of flowers in the manner of a window at Le Mans.¹

Those on the south wall depict episodes relating to the life of the Virgin, from the Expulsion of Joachim from the Temple to her Death and Assumption. They were without doubt completed by her Coronation, but the space where one might expect to find traces of this subject now bears no vestige of colour. No less than twenty-two episodes may be made out, and many of them are in exceptionally good condition. In all probability there were originally no less than twenty-five episodes, which formed an almost complete life of the Virgin.

Separating the tiers of painting on both walls are zig-zag riband patterns of the usual type.² The under and over side are treated in different tints and gradated, and the triangular spaces of the ground are further enriched (an exceptional feature) with fine pattern, most of which has perished. Here and there beneath the wall-plate a scroll pattern of somewhat unusual character appears: the stem is composed of double lines, and the usual leaf and cinquefoil or sexfoil flower is absent.

It is possible that the original scheme extended to the decoration of the whole building, but as there is now no indication of what this was, it might not be out of place to form a conjecture of its nature from other contemporary treatments. It is probable that in the window-splays were large figures of saints; on the piers bands, chevrons, or masonry patterns, and possibly in places the figure of a saint; on the soffits of the arches a masonry pattern again, light scroll work or diapers, with the voussoirs picked out in solid colour; over the chancel arch a large representation of Christ in Judgement. In the chancel itself, if the work had been carried out fifty or a hundred years earlier, Christ in Glory, surrounded by seraphs, apostles, and elders, would almost certainly have been the theme of the decoration, but at the later period greater variety prevailed, and it and patience, the copyist discovers that there is much more to be found than is apparent in the first few hours or even days.

¹ See *Religious Art in France of the Thirteenth Century*, by Émile Mâle, translated by Dora Nussey.

² Like so many other painted patterns of this and earlier periods their origin can be traced to the reticulated masonry of Romanesque building.

cannot even be conjectured whether the ancient tradition was followed or whether one of several possible alternatives was substituted.

It is much to be regretted that no more of these remarkable paintings remain; their relation to the remainder of the painting in the church would have been of exceptional interest, as the whole would have constituted one of the finest examples of the painting of a village church at a period when English painting was at its best.

In technique the paintings conform to the general English tradition, and neither show any marked advance nor betray any experimental effort, unless it be in the fusing of tints and gradating of tones. They follow in their characteristics the fashion of the illuminated manuscript of the time, the miniatures in which rely for their effect mainly on a firm line, in itself exquisitely designed, and further reinforced with thin transparent colour delicately gradated. At the same time they have the general flat appearance produced by distemper colour on a lime surface. The plaster ground has been covered with a thin wash of ochre and lime, the combination of which produced an ivory tint. Upon this the subjects, following the usual practice, have been set out in light tentative leading lines, as may still be seen in places where the final painting has diverged from them. With this slight guide the painter has laid down the drawing in long firm sweeping lines of the brush, and finally achieved his effects by picking out certain portions in flat colour and delicately tinting others. The work was executed with amazing certainty and dexterity, and has a sweetness and rhythm, a strength and reserve, the union of which mark the blending of the characteristics of thirteenth and fourteenth century art.

There is a certain difference between the work on the north and that on the south wall. To account for this difference we may suppose that the master was engaged on one, and his assistant on the other, or that the master though responsible for both, was working from two different types.¹

The two series are obviously contemporary one with the other, and yet, however the difference is to be explained, the dignified, yet dramatic, grouping of the figures in the series which depicts the Passion preserves the more abstract qualities of an earlier type more nearly than does the sweeter and more intimate rendering of the episodes in the Life of the Virgin.

The actual pigments used are limited in number. Yellow and red ochre predominate as usual; black is used sparingly, while blue and vermillion occur in slight traces only. They are, however, mixed with one another and gradated

¹ It would be out of place here to discuss at length the extent to which the painter was indebted to the illuminator, and vice-versa. The painter certainly owed much to the illuminator, and on the other hand the illuminator sometimes copied the painter. Perhaps it would not be wise to attempt too violent a separation of the two arts, as the connexion of the one with the other must have been very close.

with white (lime) and black to form a variety of tints and tones, the general effect of which is one of harmony and warmth.

If the Croughton paintings are compared with the illuminated manuscripts of the East Anglian School a strong family likeness becomes apparent. Especially is this so in the Psalter of Robert de Lisle; in fact the representation of the Last Supper, in which Christ is portrayed in the act of giving the sop to Judas, while St. John rests his head on the table in front of Him, is almost identical with that at Croughton. In details of drawing, as for example in the hands and feet, there are marked points of similarity with the Holkham Hall Bible. A characteristic, which could only be the result of closely allied workshop practices, is that of the drawing of the little finger; whereas the other fingers may be straight, the little finger is nearly always flexed in an outward bow, which gives the hand an element of grace. And again the drawing of the toes, with their suggestion of suppleness, is the same in both cases. This may be clearly seen in *The Entry into Jerusalem*. Notwithstanding these resemblances, however, it is not quite possible to classify our paintings as the work of the East Anglian School. Their connexion with the miniatures in *Queen Mary's Psalter* is equally pronounced. There is a distinct similarity in the style, except that the latter have a lissom grace of line, which marks an advance, and serves to indicate that the actual date of execution was later by a few years. In *The Last Supper*, again, the central figures are very much alike, and there is, although in a minor feature, one striking similarity: the flagon, placed in the painting at Croughton at the end of the table, appears in precisely the same position in almost all the feast-tables depicted in the *Psalter*, and in every case it is of the same pattern.

In many minor points our paintings resemble the work of the Westminster School. The *Annunciation* is not unlike the representation of the same subject on the back of the sedilia at Westminster Abbey, although the technique of the latter (it is executed in size and oil on wood) is totally different; the double line of the scroll pattern, which appears at intervals beneath the wall-plate, is a mannerism of the London workshops, and occurs in the painting on the Crouchback and Aveline tombs at Westminster Abbey, and on other tombs of the same school elsewhere. The *Annunciation*, moreover, is very similar to that executed in embroidery on the Felbrigge book-cover, which is also of London workmanship.

The evidence all seems to point to the conclusion that the paintings are a product of the London School, and not directly the outcome of any monastic establishment, such as St. Albans or Westminster. They were probably executed by a professional painter, who must have been one of the foremost masters of his time, ranking with such miniaturists as the master of *Queen Mary's Psalter*, or Master Thomas, the contemporary Westminster painter.

There is no internal evidence, either in the building itself or in its paintings, to fix definitely the date of their execution. Their approximation in style, however, to the works mentioned above leaves little room for any doubt that they were executed about the year 1300 or very early in the fourteenth century.

So far we have considered our Croughton paintings solely in their relation to other contemporary English work. If we turn to Italy we find that it is the period of Giotto's great activities and of the formation of that tradition, which is generally accepted as being the parent of modern painting. The relation of Giotto to subsequent painting is a subject which has always been carefully considered, but the influences which went to the making of Giotto have never received the same degree of attention. Giotto inherited the classical tradition of painting, which had passed through many centuries of Byzantine formation and abstraction, and was receiving again a renewed vitality by a reversion to its classical source. Into this he was instrumental in infusing the spirit of his times, which may be considered from so many different standpoints, such as, for instance, the Franciscan movement. These three distinct lines of influence—traditional classicism, revived classicism, and medievalism—were brought to a focus by his genius, which rose above the artistic horizon to usher in the renaissance of Italian painting.

But the spirit of the time is perhaps best studied in the North; for here, rather than in the South, we find the source of that vitality, intensely idealistic yet human and gay, which is the key-note of the Gothic spirit.

In suggesting a comparison, which may seem presumptuous, between the Croughton paintings and Giotto, we have to bear in mind that the former were primarily utilitarian; they existed for the instruction of the people, and were literally the 'Biblia Pauperum'. The work was rapid¹ and slight, and in this respect it has a certain affinity to Egyptian wall-paintings or the paintings on Greek vases. It was not an exceptional effort; probably most of the churches in the neighbourhood were treated equally well. There was no aesthetic pre-occupation, and their beauty was rather the result of a happy combination of circumstances and favourable conditions.

They belong to a type which was peculiarly the possession of village churches in England and the north of Europe generally. In Italy we do not find work of the same character. The technically more ambitious paintings, such as those which existed formerly in the Painted Chamber and St. Stephen's Chapel at Westminster, would provide more equitable grounds for a true comparison, but unfortunately examples of this type are only too rare. It may in a

¹ To estimate with any precision the length of time taken to paint the whole of a village church such as Croughton would be of course impossible, but roughly one might safely say that a painter and one assistant probably took no longer than two or three months.

sense be equally true to say that the work of Giotto was utilitarian, but nevertheless it is quite apparent that his quest of beauty and reality is more reflective and self-conscious, and that his works in point of labour and concentration are, in comparison, as months to days. As an illustration we might take a definite example, such as the heads of Christ and Judas in the 'Betrayal', and compare it with Giotto's rendering of the same subject in the Arena Chapel at Padua. The general differences, alluded to above, become manifest, but at the same time a remarkable similarity is apparent, especially in the head of Judas. In both cases his features are typically Jewish, and his eyes are haunted by the same furtive look. In the head of Christ, although that in the Arena Chapel painting is in profile, we realize the same quiet dignity, the same sad consciousness of the act of betrayal, an act which in the Croughton painting is further emphasized in a masterly way by the scoffing figure putting out his tongue. In technique, perhaps, Giotto and our Croughton paintings are separated by an enormous gulf; in the spirit actuating the work they are not so far apart. Giotto might well owe something to the influence of our Northern School of painting.

II

BY THE PROVOST OF ETON

The church of All Saints at Croughton near Brackley, in Northamptonshire, is distinguished by the possession of a remarkably extensive series of wall-paintings of the end of the thirteenth century, illustrating the Life and Death of the Virgin and Infancy and Passion of Christ: thirty-six scenes in all. These are the subject of my paper. I do not attempt to touch on any points of interest in the structure as a whole, or on its history: no, not even on the later painting in the church, a Last Judgement of the late fifteenth century over the chancel arch. The earlier cycle of pictures alone could afford material for an evening's discussion of portentous length. They were discovered in 1921.

The Vicar, Mr. J. Willis Price, has been throughout fully alive to the interest of them, and indefatigable in his efforts to preserve and record them. To him and to Mr. A. B. Ramsay of Croughton House, late Lower Master of Eton, and now Master of Magdalene College, Cambridge, we owe it that we are able to see a masterly reproduction of the whole set; for by their procurement drawings were made by Mr. E. W. Tristram, characterized by his never failing skill and faithfulness, from which the illustrations have been taken. Our Fellow Mr. C. E. Keyser has also spared no pains in having photographs taken, and I should like here to intercalate the remark that, in common with every one who concerns himself with English wall-paintings, I am conscious of a very great debt to

Mr. Keyser for all that he has done in recording and studying them in every part of the country.

I have decided to divide my paper into two parts. First, I will describe the illustrations successively, and explain what it is that they show: then I will make some observations of a general kind upon those portions of the cycle which are most distinctive.

I will dismiss the question of date very shortly. I believe that the paintings fall within the thirteenth century: 1280 is the earliest date that I could suggest for them: 1300 the latest. If I am wide of the mark there are those here who can correct me.

Nor am I prepared to be more prolix as to the artistic merit of them. I need but say that it is very markedly higher in my opinion than the large mass of mural painting can show. If the painter cannot be described as a great master, he is at any rate a most competent one. His very simple medium and colour scheme he can use to the best effect, and we see the sense of beauty and the reverent spirit all through his work. But on all these points Mr. Tristram has already spoken with authority.

As to the arrangement of the paintings. The Life and Death of the Virgin and the Infancy of Christ are painted in three zones on the south wall of the south aisle. They begin with the uppermost zone and read from east to west. The Passion is in two zones on the wall of the north aisle, and reads from west to east. At the east end of the lower zone are two paintings (of St. Anne and the Virgin, and of the Annunciation), which probably belong to a Lady chapel at the east end of the aisle.

We might properly describe the whole south wall as devoted to the Virgin, for no scene is there in which she is not concerned.

Description of the Paintings.

South wall from east. Zone I.

1. The Rejection of Joachim's offering (pl. xxxvi, fig. 1).

Fragmentary. There are remains of two figures. On *l.* the high priest, who is called Reuben in the earlier books and Issachar in the Plays. His bearded head, bust, and hands remain: he is mitred and wears amice and chasuble. His hands are extended: with the *l.* he may be repulsing Joachim. He turns slightly to *r.* and the tails of his mitre fly out almost horizontally as if to indicate brusque movement. On *r.* is Joachim, bearded, with head thrown back as in consternation, and *r.* hand up (the outline of it is partly double): traces perhaps of his *l.* hand are visible. He wears a red under-robe and light mantle.

Here a window intervenes.



Fig. 1. S. 1. The rejection of Joachim's offering



Fig. 2. S. 2. The Angel and Anne. 3. The Meeting at the Golden Gate. 4. The Birth of the Virgin



Fig. 1. S. 4. The Birth of the Virgin (part).

5. The Presentation of the Virgin (part)



Fig. 2. S. 5. The Presentation of the Virgin (part).

6. The Virgin leaving her home

2. The lower part of one figure facing *l.* in red over-robe and slate coloured under-robe. The colours agree fairly with those of Anne in the next scene, and not with those of Joachim. So the subject may be the angel appearing to Anne to promise the Virgin's birth (pl. xxxvi, fig. 2).

3. The meeting of Joachim and Anne at the Golden Gate (pl. xxxvi, fig. 2). The husband and wife embrace. Joachim arriving from *l.* has light yellow over-robe and light coloured under-robe and black shoes. A hat of beehive shape hangs on his back. Anne who caresses his beard with her *l.* hand has head-dress consisting of a band passing under her chin (and probably securing a close cap), and a fillet or diadem placed over it and embattled all round: her upper robe is red with light lining: the under-robe bluish and light coloured. Joachim's *l.* arm is round her neck and his hand on her back.

The background, the Golden Gate, is a trefoiled round-headed arch: a line of little battlements above it: the open doors coloured yellow.

4. The Birth of the Virgin (pls. xxxvi, fig. 2, and xxxvii, fig. 1).

On *l.* the arm of a woman in red habit, and what might be the corner of a pillow with a knob or knot, or else part of a vessel. Then a blank space.

Next facing *l.* a woman in red upper-robe. A white head-dress surmounts the top of her head and hangs down her back.

In front of her, how supported we do not see, is the back and head of the infant Virgin, not swaddled, but clad partly in red. She has short hair.

I had thought at first that this woman was a nurse, but I now take her to be St. Anne sitting up in bed and holding the child. The drapery which would be her skirt if she were standing is yellow and light-coloured, has no trace of folds, and might be part of the bed. The difference between her head-dress here and in no. 3 may be due to the fact that she is a mother.

On *r.* is an elaborate cradle with balustered sides and the end parts carved into foliage. Three white bands cross the bed-clothes of it.

5. The Presentation of the Virgin (pl. xxxvii, figs. 1 and 2).

On *l.* Anne (as I take it), clad as in no. 4, faces *r.*, lays her *l.* hand on the shoulder of Joachim and her *r.* on his head. He, in red mantle, and light under-robe, is somewhat stooping. He has a linen head-dress and in his *l.* hand holds (very insecurely, by the ends of his fingers) what looks like a girdle, yellow, with four bands indicated by pairs of black lines crossing it near the top and bottom. The background is a gate just like the Golden Gate in 3, but without battlements at the top.

When I thought of the figure in 4 as a nurse, I took this group to be Joachim entering the chamber to see the child, and the nurse receiving him.

But I am now confident that the group belongs to the Presentation. Joachim, holding the empty purse in which was his offering, is turning away in sorrow at leaving his child, and Anne is consoling him. Two points seem to me strong in favour of this. First, Joachim and Anne are always present in the scene of the Presentation. Second, the gate we see in the background represents the Temple not only in 3 but also in 7 (the Espousals). Besides, the attitude of the woman is far more appropriate to a wife caressing her husband than to a servant.

On *r.* a flight of fifteen steps, the stones marked out in red. Standing on the third from the top was the child Virgin. Only her head facing *r.* remains. On the top step was the high priest receiving her: a part of his back and drapery remains. Behind him is the altar draped with red.

6. The Virgin leaving her home (pl. xxxvii, fig. 2).

On *l.* Anne seated facing *r.* on a plain wooden seat. Her hair, reddish brown, is confined by a vertical and a horizontal band. She wears a red mantle and light gown. With her *l.* hand she supports an open book (blank), with her *r.* admonishes the Virgin who stands looking on the book and touching or supporting it with her *r.* hand. She is a small slim figure with flowing white kerchief on her head, red robe, white close sleeves.

Joachim on *r.* takes her by the *l.* hand and points to *r.* looking towards Anne. He wears a red skull cap, red cloak (fastened by a yellow brooch) with dark lining: the under-robe light. Face, most of the body, and legs, are obliterated. Near him on *r.* two sheep, one feeding. Farther off is a tree.

When I come to make remarks on this part of the cycle I shall try to show the meaning of this scene, which is strictly speaking incompatible with the rest of the story. At present I must go on with the work of description.

At this point the top of a window intervenes. There follows:

7. The Espousals of Mary and Joseph (pl. xxxviii, fig. 1).

a. On *l.* a group of seven figures. The two on *l.* and one on *r.* may be young men—suitors. They are bareheaded. The others are women, three with kerchiefs on their heads, one with a banded head-dress like Anne's. They are looking to *r.* and the attitudes of their hands express interest or surprise.

In front of a doorway just like the Golden Gate (but not embattled) is the marriage group. *l.* a bare headed boy in white robe. Then Joseph bareheaded, bearded, in robe mainly yellow, dark hose, white sleeves. An indication of the flowering rod in his *l.* hand. *centre* the High priest, beardless, *nimbed*, full face, in white and red chasuble and alb, with yellow apparel (?). He may be joining the hands of Joseph and the Virgin, but his hands are not really visible. The Virgin on *r.* much effaced, in light robe, is clearly taking the hand of Joseph.

b. On *r.* of this is a vacant space in the upper part. At bottom we see four



Fig. 1. S. 7. The espousals of Mary and Joseph



Fig. 2. S. 8. The Visitation. 9. The Nativity. 10. The Angel and the Shepherds



Fig. 1. S. 11. The Magi before Herod.

12. The Adoration of the Magi (part)



Fig. 2. S. 12. The Adoration of the Magi (part)

steps, and on *r.* an altar draped with red and some indication of a figure standing before it.

It may be complementary to the group of the Espousals, but there is also the possibility that it may be another scene: if so, it would be the appearance of the Angel to Zacharias.

Here begins Zone II reading from east to west.

The space on the *l.* of the window, now vacant, must have contained the Annunciation: then, on *r.* of the window.

8. The Visitation (pl. xxxviii, fig. 2).

Only a fragment remains showing the lower part of the two embracing figures. The one on *l.* seems to have had a light red robe and white skirt, the other a darker red robe over yellow.

9. The Nativity (pl. xxxviii, fig. 2).

The Virgin is reclining in front—her head to *l.* The upper part of her body is obliterated. The bed is covered with a red quilt, a white sheet appears below. Above the feet of the Virgin is the manger with the swaddled Child, the ox's head seen on *r.* On *r.* sits Joseph leaning with both hands on his staff. His chair has double knobs at the top of the back and the arm.

10. The Angel and Shepherds (pl. xxxviii, fig. 2).

The Angel stands on *l.* with *r.* wing in repose and *l.* wing raised. His *r.* hand is raised in admonition: in his *l.* he holds a (blank) scroll rising upwards.

On *r.* is seen part of a shepherd, viz. a hand leaning on a staff, the legs, and the end of a bagpipe (at top) hanging down. By his feet a dog stands barking at the angel.

11. The Magi before Herod (pl. xxxix, fig. 1). This painting is over the arch of the door.

Only the foremost of the Magi and a fragment of the second remain. The foremost is crowned—his face nearly gone. His *l.* hand is raised and he addresses Herod seated *r.* facing *l.* Herod is crowned and bearded and probably his legs are crossed. In his *l.* hand, which rests on his thigh, he holds a sword, point upwards.

12. Adoration of the Magi (pl. xxxix, figs. 1 and 2).

Over the *r.* part of the arch are two—possibly three—horses. The nearest to the front is white, that (or those) beyond, red. The heads are to *r.* and the rein is held by a bearded servant in a yellow and black habit, the colours counterchanged. The head-dress covers head and neck and has a zig-zagged line surrounding the lower part. The man holds a javelin in his *l.* hand, upright. The horses are saddled.

Next the three Magi: all were crowned, but the heads of the first and third are much effaced. The foremost kneels and holds up a cup in his *r.* hand, and probably the cover of it in his *l.* The second holding a covered vessel in both hands stands nearly full face looking rather to *l.* He is bearded. The third, holding a covered cup in his *r.* hand, has his *l.* hand raised and faces *r.*: he may be beardless. All have mantles.

On *r.* the Virgin crowned, with a kerchief on her head, sits on a stone (?) throne without back, and with both hands supports the Child standing on her knee. He is in red robe, has cross-nimbus, and blesses with his *r.* hand: the *l.* hand extended.

Here a window intervenes.

13. Massacre of the Innocents (pl. XL).

A soldier with sword horizontal above his head, in his *r.* hand, tramples on two dead children (in yellow and black), and with *l.* hand seizes the wrist of another child—larger, in long robe—who stands on the knee of a mother sitting on the ground. She embraces it. A nude (?) child clings to her back. Near her on the ground are two heads of children.

A second soldier behind her on *r.* holds the *l.* ankle of a nude child whose head and body, hanging down behind the mother, are not seen. The hand of another (?) child hangs down near his skirt.

The soldier on *l.* has yellow surcoat over mail, and close (mail?) cap. The other has red surcoat and broad helmet. Any observations on the armour will be welcome to me.

14. The Flight into Egypt (pl. XL).

The Virgin in black mantle which covers her head holds the Child (swathed in black) on her *l.* arm. She is seated on a saddle or cloth laid on a yellow donkey which is led to *r.* by Joseph, bareheaded (and barefoot?) in red tunic, with black hood round neck. A purse and knife in sheath are hung to his belt. With his *l.* hand he holds a staff over his shoulder, over which a white cloak hangs; and he looks back to *l.*

Zone III reading from east begins here.

15. The Presentation of Christ (pl. XLI, fig. 1).

Only the heads of the *l.* portion remain. Reckoning from *l.* these are: Joseph, nimbed, with small cap: the midwife or maid: head-dress of vertical and horizontal bands, her *l.* hand holds a candle. The Virgin with red nimbus—a white line near the edge of it. A kerchief or loose linen hood over her head. The Child with cross-nimbus, the cross black on yellow. All look to *r.*

A window intervenes.



S. 13. The Massacre of the Innocents. 14. The Flight into Egypt

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Here ends the Infancy series, and the Death and Assumption of the Virgin follow.

16. The palm brought by the Angel to the Virgin (pl. XLI, fig. 2).

Of this only a fragment of the Virgin's figure remains, viz. the upper part, facing *l.*, showing red nimbus with white line (as in 15 and subsequently), kerchief, and red robe.

17. The Virgin gives the palm to St. John (pl. XLI, fig. 2).

She sits facing *r.* (robed as before), her *l.* hand is raised: with her *r.* she hands the palm—shown as a yellow staff tapering to the top—to John, who stands before her in lightish mantle over red, and takes it with his *r.* hand, holding up his *l.* hand somewhat. He has yellow hair and slaty nimbus.

18. Arrival of the Apostles (pls. XLI, fig. 2, and XLII, fig. 1).

Mutilated. The Virgin stands facing *r.* Five heads of Apostles facing her are seen, and the lower draperies of an uncertain number.

19. Death of the Virgin (pl. XLII, fig. 1).

Still more mutilated. At top on *l.* are the tops of two nimbed heads—of Apostles(?). They might conceivably belong to 18, but the heads there are not obviously nimbed.

Lower down and slightly to *r.* are portions of white draperies which must belong to the bed on which the Virgin lies. Pieces of coloured drapery are on *r.* of this.

20. The Funeral, and Miracle of the Jews (pl. XLII, fig. 1).

A gap has carried away all the figures of the Apostles bearing the bier. But to *r.*, in the upper part is seen the pall, red, wrought with a pattern of lozenges enclosing four-petalled flowers. On the surface of this hang two diminutive figures with arms outspread—the Jews who have tried to upset the bier, and whose hands cling to it. Below is seen a bit of drapery.

At this point the door interrupts the series.

21. Christ and the Apostles at the tomb (pl. XLII, fig. 2).

The figure which I take to be that of Christ stands facing *r.* at the head of the tomb: it is bearded and nimbed, and the nimbus seems to have a cross. The mantle is light-coloured, the under robe red. The *r.* hand depressed, the *l.* raised.

Of the tomb little is seen. There is an indication of cusping or arcading along the top.

The Apostles are in a group facing *l.* near the foot of the tomb: seven or eight nimbed heads may be seen or guessed. The second figure from *l.* holds a book and extends his *r.* hand. He has a mantle fastened by a morse in front.

22. The Assumption (pl. XLII, fig. 2).

In a mandorla (yellow) the Virgin, full face, in light robe, and red nimbus with white line: with joined hands.

The mandorla was supported by four angels, but only those on *l.* are really visible.

Here the bottom of a window intervenes.

The space west of it has nothing; almost certainly the Coronation of the Virgin was represented here.

North wall from west. Upper Zone.

1. The Entry into Jerusalem (pl. XLIII, fig. 1).

The left-hand portion and the upper are mutilated. We have the greater part of the ass, moving to *r.* Our Lord seated on a cloth laid on its back: with his *r.* hand blessing, with his *l.* holding the rein. His robe is white. The head is gone. The greater part of one Apostle holding a book, and following, is seen, and the feet of several more.

On *r.* the lower part of a man in short cloak, darker hose, and light shoes, who is spreading a red, sleeved tunic before our Lord; he holds it by the sleeves. Behind him the lower part of at least two robed figures, and behind them a quadrangular building, tall and narrow, with indication of an arch. About the feet of the ass lie sprigs—trefoils—of leaves, showing that there was a tree with a man in it, as usual, above.

The composition is exactly that of the painting in the Chapel of the Holy Sepulchre in Winchester Cathedral, to cite but one instance of like date to Croughton.

2. The Last Supper (pls. XLIII, fig. 2, and XLVIII).

A long table covered with a white cloth with pleated folds at regular intervals along the front. On it are many vessels, dishes, &c., notably a flagon, a covered cup, a salt cellar (?) on three legs, with cover, knives, &c. No definite representation of the Paschal Lamb.

The figures are *l.* five Apostles; *c.* Christ, John, and Judas; *r.* five Apostles.

l. The first pair, beardless and bearded, are conversing. The first holds a knife (?) in his *r.* hand on the table, the second puts a morsel to his mouth. Of the next pair the left one is much defaced, the other has in his hand some sort of small vessel (or possibly a roll) resting on the table.

The next figure is St. Peter with raised hands, looking towards Christ.

c. Christ with cross-nimbus, in mantle fastened by a morse, and hair falling on his shoulders, lays his *l.* hand on the head of John, who leans over to *r.* on his breast, and with his *r.* arm *over* the neck of John hands the sop to Judas, who



Fig. 1. S. 15. The Presentation of Christ



Fig. 2. S. 16. The Angel brings the palm to the Virgin. 17. She gives it to St. John. 18. The arrival of the Apostles (part)



Fig. 1. S. 18. The arrival of the Apostles (part). 19. The death of the Virgin. 20. The funeral, and miracle of the Jews



Fig. 2. S. 21. Christ and the Apostles at the Tomb.

22. The Assumption

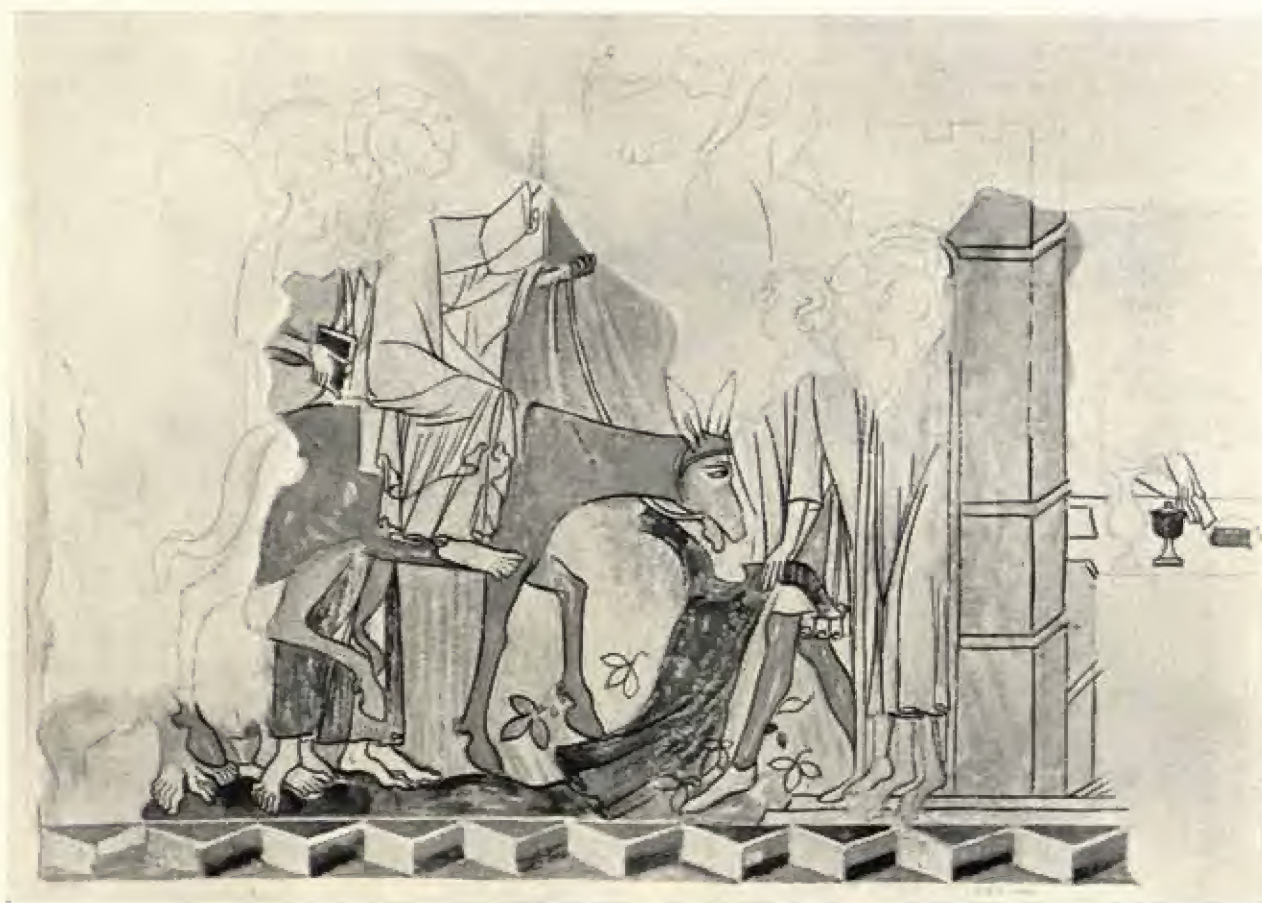


Fig. 1. N. 1. The entry into Jerusalem



Fig. 2. N. 2. The Last Supper



Fig. 1. N. 3. The Betrayal. 4. Christ before the High Priests. 5. The Mocking



Fig. 2. N. 6. The Scourging. 7. Bearing the Cross. 8. The Crucifixion: the side pierced

kneels on this side of the table. Judas' head has suffered, but it is obvious that it was an ugly one. He and John are the only figures without nimbi.

r. The first figure, bearded, looking at Christ is defaced. The next pair (the *l.* one beardless, the *r.* bearded and defaced) look at each other. So do the last on *r.*, of whom the first is beardless and the other has almost disappeared, one hand being plainly visible.

After this is a vacant space extending over the top of the door. There seems to be room for either one or two scenes. The Washing of Feet and the Agony in the Garden are the most likely—indeed, almost the only possible—subjects to have filled it.

3. The Betrayal (pl. XLIV, fig. 1).

The lower part has disappeared. There remain (from *l.*) the upper parts of two Apostles facing *r.*: of Christ in yellow mantle, with cross-nimbus, red on blue, kissed by Judas, whose *r.* arm is about his neck. Christ seems to have a book in his hand. Judas is bearded, and not like the representation in 2.

Next a soldier (putting out his tongue) with *l.* arm, holding sword, raised high: a long halberd sloping to *r.* and a javelin, upright, are held by indistinct figures. The scene is divided from the next by some red colouring which might represent a curtain.

4. Christ before the high priests (pl. XLIV, fig. 1).

He is stripped of his mantle and wears only a light-coloured robe girt at the waist. The cross-nimbus is white on blue. He stands between two guards. The one on *l.* has the peak of a head-dress turning upwards from his forehead: the other is much defaced. The judges sit together facing *l.* The one nearest the spectator is hook-nosed and bearded, and wears a Jewish cap with a small tuft at top: his *l.* hand is raised in denunciation. The farther figure is also bearded: his cap has a long tail rising up behind. Both are a good deal defaced. I take them to be Annas and Caiaphas.

5. Of the next scene, the Mocking, as I think, not much remains (pl. XLIV, fig. 1). We have first a beardless figure in hood and red tunic, looking *r.* and upward, both arms raised. Then an indistinct mass, probably our Lord: then a head turned rather to *r.* I think the scene may have been that of our Lord blindfolded and smitten by men who say, 'Prophecy, who is it that smote thee?'

At this point the top of a window intervenes.

6. The Scourging (pl. XLIV, fig. 2).

On *l.* the upper part of a tormentor—long-nosed, beardless, with a tall winged cap. *c.* Christ, stripped to a loin-cloth, his arms crossed about the pillar; he looks to *l.* and downwards. *r.* A tormentor holding a scourge in both hands

above his head by its wooden handle, and capering on one leg. This man wears a close cap: his profile is ugly.

The slender pillar spreads out at top into a little piece of architecture. Battlements surround it, and it consists of a roof gabled in *c.* and at the ends; the gables are topped by balls.

7. Bearing the Cross (pls. XLIV, fig. 2, and XLVII, fig. 1).

Either five or three figures constitute this group. First a bareheaded tormentor, beardless, in red and white tunic (colours counter-changed), who holds up in his *r.* hand a short piece of wood (?) as if about to strike with it. With his *l.* hand he pushes Christ forward, and kicks with his *r.* leg.

Christ in loin-cloth and narrow close belt above it, bearing the long slender T-shaped cross, looks back at him. Another tormentor, with short curved tail to his cap, is seen beyond Christ.

The remaining figures are the Virgin, full face, who is swooning: her head droops to the *l.*: and a nimbed woman behind her who supports her with both arms. These figures may perhaps be taken as common to this and the next subject. To that they certainly have some relation, for the Virgin is needed to balance the St. John.

8. The Crucifixion. The side pierced (pls. XLIV, fig. 2, and XLVII, fig. 1).

Longinus in a longish red coat showing white underneath. He is bareheaded and bearded. With the lance in his *r.* hand he wounds the side of Christ. His *l.* hand is raised and, with the wrist sharply turned down, he touches his *l.* eye with his forefinger.

The Cross has nothing visible above the cross-beam. The base is in a socket in a block of stone. The head of Christ is effaced. The feet are crossed. None of the three nails is clearly visible.

On *r.*, close to the Cross, is the lower part of a man's figure in light-coloured tunic. Then St. John, probably holding a book and looking to *l.* and slightly downwards. The mutilated figure between him and the Cross ought to be offering the sponge, but nothing is to be seen. And well to *r.* of St. John is the appearance of a long pole sloping to *l.*, not seemingly held by any one, and at top, in a line with it, a round yellow-brown object which might be the sponge, but might also be the moon, though nothing corresponding to the sun is visible on *l.*

Here begins Zone II, reading from West to East.

9. The Deposition: somewhat effaced (pl. XLV).

l. The Virgin in blue over yellow looks to *r.* It is not clear that she is helping to support the body of Christ. Her nimbus is red.

A bareheaded, robed, bearded man embraces the body as it is lowered.



N. 9. The Deposition. 10. The Entombment

Published by the Society of Antiquaries of London, 1927

The *r.* arm hangs over his shoulder. The body has the loin-cloth, and the head the cross-nimbus. There is no trace here or elsewhere of the crown of thorns. The feet are not wholly detached from the Cross. The Cross is still T-shaped. In all three pictures it is particoloured: a band of red runs along the middle of both beams, on a yellow ground.

On *r.* St. John, in light blue mantle over red, supports the *l.* arm of the body. In front of him a small beardless man, in ample linen hood and tippet and red tunic, is no doubt engaged in drawing out the nail that pierced the feet, with pincers: but this is not clearly seen.

10. The Entombment (pl. XLV).

The tomb is of bluish stone, supported on three open cusped (cinquefoil) arches.

On *l.* the Virgin supports the upper part of the body of Christ. Joseph, bearded, in brimless hat, with yellow nimbus, pours ointment from a large white bottle, upon the *l.* arm, on which he lays his *l.* hand.

St. John, in red mantle over lighter robe, helps to dispose the feet.

11. The Harrowing of Hell: a good deal effaced (pl. XLVII, fig. 2).

The *l.* portion is occupied by a very large Hell-mouth of which, the open jaws and the eye may be seen. On the top of it are two red demons with long pointed ears. The one on *l.* is shaggy and has a tail: the other may be tailed, certainly is winged. Both look to *r.* and stretch out arms excitedly.

Traces of another demon may be lower down, and the broken doors of Hell seem to lie on the ground.

On *r.* Adam (bearded) and Eve, both nude, advance suppliantly towards Christ. His figure is much damaged: the cross-nimbus is seen, and he holds upright a tall cross with discs at the ends of the arms. He may be taking the hand of Adam.

12. The Resurrection: the *l.* portion only remains (pl. XLVII, fig. 2).

The tomb is blue, and the interior of it is coloured red. The arches seen in 10 are not visible here. A pointed object may have been part of one of the soldiers.

On the *l.* end of the tomb kneels a small angel in white with wings spread upright, adoring.

Part of the figure of Christ remains, with the *r.* hand raised.

There is a considerable gap here. Probably the Resurrection filled the space up to the doorway which is situated here. East of the door might have been two scenes, either the Women at the Sepulchre and the Ascension, or the Ascension and Pentecost. Then there is a very indistinct painting of a pot of flowers, resembling generally the lily-pot in no. 14, and perhaps marking the

limit of the Lady Chapel. Then comes a window, and east of it a patch of late painting with remains of a black-letter text.

13. St. Anne and the Virgin (pl. XLVI).

St. Anne has dark nimbus, light mantle, fastened with a brooch in front, red robe. She holds an open book. It is being read by the Virgin, a small figure on *r.* with light nimbus and flowing hair. The lower part of the painting is much effaced.

14. The Annunciation (pl. XLVI).

Gabriel on *l.* in white mantle over red robe, and white wings (the *r.* in repose, the *l.* extended horizontally), faces *r.*: points with the forefinger of his upturned *r.* hand, and holds in *l.* a blank scroll hanging down.

A beautiful lily-plant is in *c.* with three blossoms on the upright central stalk, and subsidiary ones at the sides. Part of the large vase in which it grows is seen at bottom. A red scrawl here is of uncertain meaning, if any.

On *r.* the Virgin: the nimbus is red and has a thin white line. The hair is fair and flowing. She faces *l.* and holds up her *r.* hand. The *l.* was probably holding a book. The Dove flies from *l.* towards her right ear. Only the upper part of her figure remains.

The Last Judgement over the chancel arch is a remarkable one: but it is of late (?) fifteenth-century date, and has nothing to do with our series.

You have now seen the whole cycle of the Croughton paintings. They fall into five sections.

South wall. 1. From the Rejection of Joachim's offering to the Espousals, nos. 1-7.

2. From the Annunciation to the Presentation of Christ, nos. 8-15.

3. The story of the Death and Assumption of the Virgin, nos. 16-22.

North wall. 4. The Passion, nos. 1-12.

5. The Lady Chapel paintings, nos. 13, 14.

Only upon the first and third of these sections shall I venture to offer remarks of any length. The first is unique among English wall-paintings, the third very rare.

Section 1. From the Rejection of Joachim's offering to the Espousals.

It is clear that the early scenes of the Virgin's life, introducing her parents, are rather late importations into Western art, and depend on Byzantine tradition.

The cult of St. Anne in the West, first traceable in art in the eighth-century paintings of St. Maria Antiqua in Rome, was of slow growth. It was not till



N. 13. St. Anne and the Virgin. 13. The Annunciation

Published by the Society of Antiquaries of London, 1927

1382 that, on the occasion of the marriage of our Richard II with Anne of Bohemia, the Pope ordained it to be of universal obligation. But we find her in kalendars of much earlier date: that in Vitellius E xviii from Winchester, of the eleventh century, is as early an English instance as I have noted.

As to our cycle: I have not so far succeeded in finding any representation of the Rejection of Joachim's offering older than that on a sculptured capital of the central portal of Chartres Cathedral (west front), which is of the twelfth century.

In England I find instances in the twelfth century. The Psalter Nero C iv, written at Winchester, has the angel appearing to Joachim, to Anne, the meeting at the Golden Gate, the Birth and Presentation of the Virgin. But the Rejection is apparently not there, though one scene immediately preceding the appearance to Joachim might be a perversion of it. This Psalter, it may be remembered, has two paintings of definitely Italo-Byzantine character among the thoroughly English ones which form the greater part of the series. How they came to be there nobody quite knows, but one recalls in this connexion the fact that the Joachim and Anne scenes are much more the property of Italy than of the rest of Europe. Let me add that the most elaborate presentation of them, extending to eleven scenes, will be found figured in van Marle's *Schools of Italian Painting* (I, figs. 141-4): it is of the thirteenth century, from Pisa.

But the Rejection is undoubtedly found in English art in a twelfth-century book of pictures of the Life of Christ connected with Bury St. Edmunds (no. 1 in the Dyson Perrins collection); an example of the thirteenth century is in the Brailes Horae, no. 4 in the same collection. The fourteenth century gives it in the Carew Poyntz Horae (Fitzwilliam MS. 48), in sculpture also in the Lady Chapel at Ely. The fifteenth in glass at York Minster (south quire aisle): probably the series would close with the fine picture in the King's College Chapel window, which we can hardly call English.

It is commoner perhaps to begin the series with the meeting at the Golden Gate—a scene which admits of little variety, and resembles the Visitation. At Great Malvern the late fifteenth-century English glass begins with the Angel and Joachim and goes on with the Meeting.

The Birth and Presentation of the Virgin are both of frequent occurrence generally but, again, not common in English art, and never to be found, it seems, in English wall-painting.

I am well convinced that the figures of Joachim and Anne must be reckoned as part of the Presentation: they are, one may say, never absent. But I have never seen another picture in which Joachim is so distressed as he evidently is here at the parting from his child. We may perhaps see here the influence of the drama. No extant play is as early as these paintings, but in one cycle—that

called of Coventry—we have the episode of the Presentation decked out with not very dissimilar emotions.

Mary says farewell to her parents.

Most mekely I beseche I may 3ow kys
Now for3eve me yf evyr I made 3ow wrothe.

Et amplexendo osculabit patrem et matrem.

- Jo.* Nay dowter 3e offendyd nevyr God ne man
Lovyd be that lord 3ow so doth kepe
An. Swete dowtyr, thynk on 3our modyr An
3our swemyng (sorrowing) smytyht to myn hert depe
Ma. ffadyr & modyr I xal pray for 3ow & wepe
To God with al myn hert specyaly
Blysse me day & nyght evyr her 3e slepe
Good ffadyr & modyr, & be mery
Jo. A! ho had evyr suche a chylde?
Nevyr creature 3it that evyr was bore
Sche is so gracyous, she is so mylde,
So xulde childyr to fadyr & modyr evyr more.

The child is then summoned by the bishop, and the parents wait to see that she does not fall down on the altar steps. When the fifteen steps and the fifteen psalms of degrees have been safely surmounted, Joachim and Anne go home.

But now comes a complication in the story. The next picture shows Mary led away from her mother, who is tending her, by Joachim, to be betrothed. But the texts which are the source of the story—notably the *Liber de infantia*—agree in saying that Mary, once presented in the Temple, never left it till the betrothal, being fed there by angels and attended by four maidens. How then comes she to be with her parents, as we see her here?

I think one reason which made the artists break with the written story was that St. Anne is always represented as teaching the Virgin to read, and room for this had to be found in any popular presentation of the history. To say this is, I know, to raise the question—how old is the fashion of representing St. Anne in this way; and what is its origin? And that, alas, I am quite unable to answer. It seems well established in the fourteenth century, and wall-paintings at St. Cross, Winchester, and Mentmore have been assigned to the thirteenth, while we see it twice over in this church.

We have so little in the way of parallels—English parallels—to this set of scenes that I cannot cite more than one, and that is again from the Coventry plays. We have seen that one play is devoted to the Presentation, after which the parents go home. The same play goes on to portray the sojourn in the

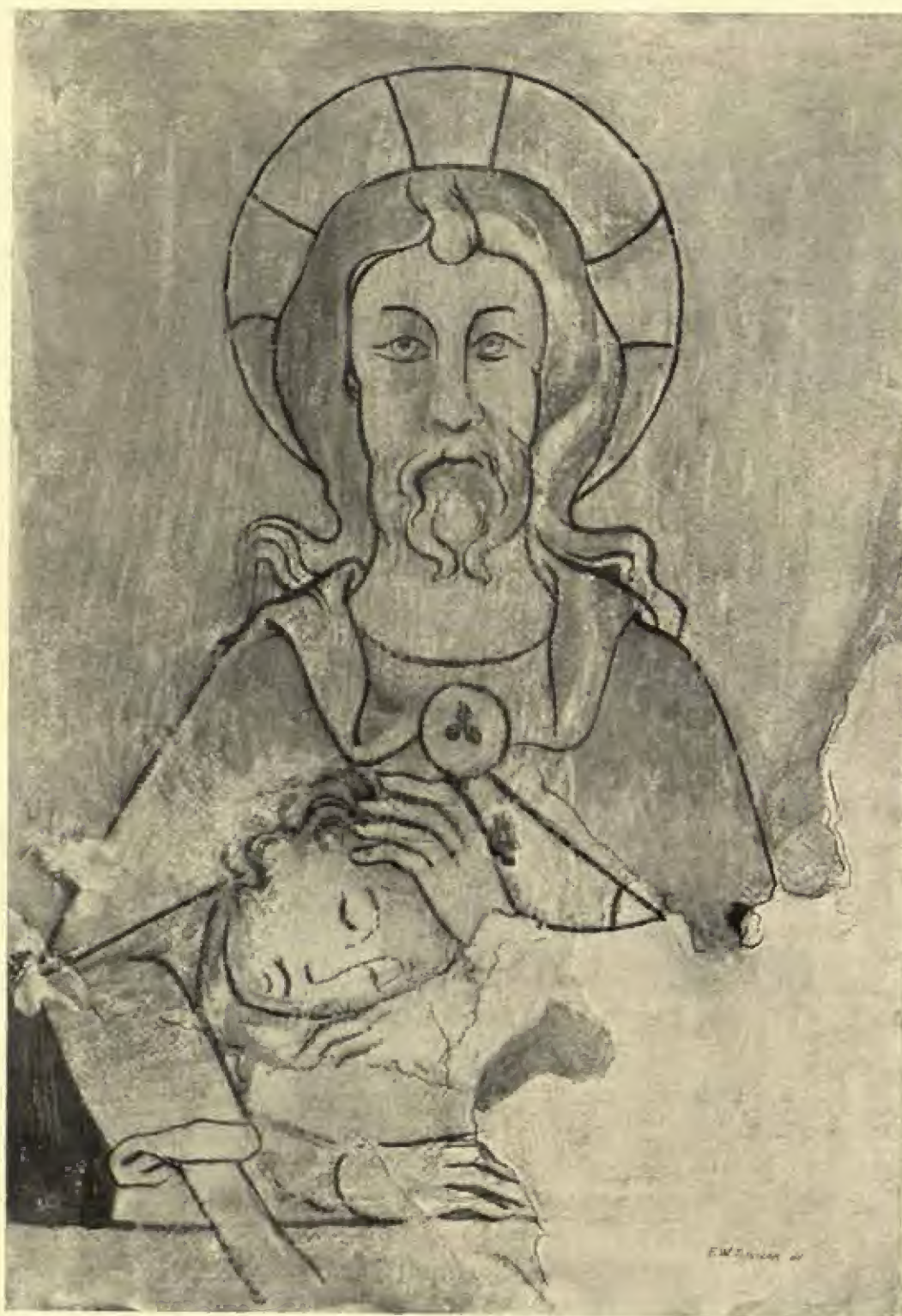


Fig. 1. N. 7. Bearing the Cross. 8. The Crucifixion: the side pierced



Fig. 2. N. 11. The Harrowing of Hell.

12. The Resurrection



N. 2. From the Last Supper : Christ and St. John

temple, and the angels ministering to Mary. The next play begins with the entrance of the bishop, who proclaims that all maidens of fourteen years and upward must be brought to be espoused. Joachim bids Anne pay heed to this and says,

Wherefore oure dowtyr ryth good & dowse
Into the temple sche must be ledde
And that anoon ryght sone

to which Anne assents, saying,

With here togedyr lete us now go
I hold it ryght weyl done

and next we find Joachim saying,

Sere busshopp, here, aftyr thin owyn hert
We have here brought oure dowtyr dere

and so on. There is no doubt, then, that the plays, like our painting, allowed for an interval spent at home between the sojourn in the temple and the espousals, though this was quite unwarrantable.

The Espousals of the Virgin to Joseph is the last scene of the first section of our story. Much the same has to be said of it as of the other subjects in the early life of the Virgin. It may be on a capital of the twelfth century at Chartres; I do not see it. It is in thirteenth-century French windows: it is in twelfth-century mosaic in St. Mark's at Venice, and it appears in not a few primitive Italian pictures. But it is not to be found in English wall-painting, nor in English art generally is it at all common. It is in Mr. Perrins's Bury MS. and in his Brailes MS., in the Carew Poyntz Horae in the Fitzwilliam (no. 48), in the sculptures of the Lady Chapel at Ely. There must be a few other instances: I shall be glad to learn of them.

In none of these examples do we see what I think is an Eastern trait (though the whole scene is passed over in the Greek *Guide to Painters*), the unsuccessful suitors breaking their rods, familiar in the Italian Sposalizi. The Greek menology tells us that the prophet Agabus was one of these disappointed persons.

I must leave it doubtful whether the appearance of the angel to Zacharias intervened between this scene and the Annunciation. There is room for it, and too much room, one would say, for the Espousals; but I find no instance of it in English wall-painting. Mr. Keyser records one at Stifford, Essex, but it is no longer to be seen.

With the Annunciation, which has disappeared, we begin a new section, ending—here—with the Presentation of Christ.

Cycles of this kind, the backbone of the story, cannot be treated here at large: they involve the whole story of Christian art. I have to limit myself strictly, and shall not attempt to discuss the types of the various scenes. Indeed, it seems to me sufficient to say that I note nothing in the least abnormal in the treatment of any of the subjects at Croughton, and to add a word about the contemporary cycles of English wall-paintings.

The sets of paintings I have found recorded, which run roughly from the Annunciation to the Flight into Egypt, and are either older than the Croughton set or fairly near it in date, are these. I shall be glad to have the list expanded.

12th century. Brook, Kent, which seems to include Christ and the Doctors, and also the Passion.

Hardham, Sussex, which has at least the Nativity and Flight.

13th century. Chalgrove, Oxon., most comparable, perhaps, to Croughton, but later.

West Chiltington, Sussex. Early life on the north wall. Passion on the south.

I doubt if this exists.

Easby, Yorks. 3 early scenes and 3 of Passion.

Headington, Oxon.

Pinvin, Worcs. Infancy and Passion.

Possibly Llanwyddyn, Montgomery. Infancy and Passion.

Sarratt, Herts. Infancy and Passion.

Earl Stonham, Suffolk. Infancy.

Timworth, Suffolk. Infancy. Destroyed.

Winchester Cathedral, Chapel of the Holy Sepulchre. Infancy and Passion.

Winterbourne Dauntsey, Wilts. Infancy and Passion: an extensive series, destroyed, but photographed. I have not seen anything of it.

Wiston, Suffolk. Infancy. Nothing visible.

Our third section consists of the story of the Death of the Virgin. For this the wall-painting parallels cited by Mr. Keyser are four only: Burgh St. Peter, Norfolk; Chalgrove; Chilton Cantelo, Somerset, destroyed (I fear under my predecessor Provost Goodford); Wimborne.

To these must be added the cycle of Brook, Kent: on the south wall of the nave, under ten round-headed arches, are as many scenes. The first is very faint; 2 has two figures, perhaps the Virgin and St. John; 3, very faint; 4 shows a pall or other vestment hatched with cross-lines; 5 may be the apostles, with the Virgin on a bed. In 6 Christ stands over a reclining figure; 7 has at top suppliant figures facing π ; 8, a number of long-haired figures facing \angle ; 9, the Assumption: two angels hold the soul in a cloth; 10 is the Coronation.

Of the rest, Chalgrove is the only one which I am in a position to judge of in detail. It is in three zones and begins with the lowest zone. It gives these scenes (fig. 1):

1. Mutilated. The angel brings the palm to the Virgin. All that is left is a female figure on *l.*, possibly one of the Virgin's attendants, and on the *r.* is a kneeling figure of the Virgin. The angel is wholly gone.

A curtain hangs down dividing this scene from the next.

2. The Virgin gives the palm to St. John. I think this must be the order, though the next zones read from right to left.



Fig. 1. Chalgrove, Oxfordshire: the death and funeral of the Virgin.

Second zone. 3. The Virgin announces her coming departure to the assembled apostles. Six of her maiden attendants are behind her, though tradition allows only four. The apostles sit and stand before her.

4. Her Death. Her figure has disappeared, but we see Christ standing near the head, apostles at the feet, angels in air above taking up the soul in a cloth, and other angels attending Christ. Very similar to this will have been the composition of the almost vanished Croughton painting.

Uppermost zone. 5. The funeral, proceeding to *l.*, and preceded by John with palm and asperge. A Jew is suspended to the striped pall, and two more are seen below, who have apparently assaulted the procession and suffered for it. A figure is kneeling before St. John.

6. St. John again (or some one very like him), and a group facing him. He is, I take it, healing the Jews who had been struck blind: for many had been thus

smitten, not only those few who attacked the bier. The healing, however, was performed by the prince of the priests, who was one of the attackers. After he had professed belief and had been healed Peter gave him the palm and sent him to heal the blinded multitude.

To this scene I do not find a parallel in wall-paintings.

It appears that there is one more scene which may belong to this series. On the other side of a window which here interrupts the line there is a picture of a body—apparently a female—being laid in a tomb. The Assumption and Coronation are on the east wall. Below the burial scene is one of people at table which looks more like the Marriage of Cana than anything else. Always supposing, that is, that they *are* at table and not standing round a tomb. The latter reading of the picture is just possible, in which case I suppose the intention was to represent the apostles returning to the tomb and finding it empty.

At Croughton we have the scene of Christ and the apostles at the tomb, and the Assumption: the Coronation has disappeared.

Perhaps a word or two about the Death and Assumption in art will be in place.

A sarcophagus (perhaps two sarcophagi) at St. Engracia at Saragossa assigned to the fourth century is supposed to afford the earliest representation: it shows the Virgin standing between St. Peter and St. Paul. A hand from above grasps her wrist. Neither date nor interpretation is beyond the reach of question.

A fragment of ancient textile work at Sens has rude roundels of an ascending figure and others below holding up their hands. An inscription (in Latin) makes it clear that the Assumption of the Virgin is really intended. This piece is of the seventh or eighth century. The *Liber pontificalis* tells of several popes of the eighth and ninth centuries giving vestments to their churches in Rome on which the story of the Assumption was wrought.

An ivory at St. Gall of the eighth century has on it *Ascensio Sancte Marie*, the Virgin in the centre between two pairs of angels, and a small gold cross assigned to the seventh century, and to Italy, has the Virgin and angels on it in niello.

An important fresco in St. Clemente, Rome, done in the time of Pope Leo IV (847), has been cited as another example. It shows at the top Christ in a circle, supported by angels: below Him the Virgin with arms outspread. On a lower level on each side is a group of Apostles in attitudes of strong emotion and astonishment. I incline to agree with those who see in the painting not an Assumption but the Ascension of Christ.

So the Assumption comes into art in the seventh or eighth century, but it is not commonly met with.

In the centuries that follow there are a fair number of miniatures in manuscripts, considering the total amount of the material. Bamberg, Munich, Paris all furnish examples of the ninth to the eleventh centuries, but I will not dwell on these: they are to be seen in Olaf Sinding's monograph. I will pass to English examples.

Our first is in the Benedictional of St. Aethelwold, the great Winchester book of about 980. Here we have a full-page picture. At the bottom is a group of Apostles. Above, the Virgin reclining on a bed, tended by three weeping women, and at the top, four angels descending with cloths and a sceptre, and the Divine Hand holding a crown. The common feature of Christ standing over His Mother's bed and holding her soul in His hands is absent here. Mr. Hamburger, in his book on the beginnings of the Winchester school of painting, speaks of this picture as standing quite apart from the Byzantine tradition: it is only paralleled in his experience by the similar picture in the Rouen Benedictional which is not independent of the other.

Next I would mention the two drawings in the Winchester Psalter Nero C iv, which were either painted by an Italian or copied from Italian work in England in the twelfth century. One represents the Death, the other the Enthronement of the Virgin.

Another twelfth-century manuscript, Mr. Perrins's Bury book, has the Death of the Virgin as the concluding scene of its set of Bible pictures.

But the best twelfth-century representation we have is in the fine York Psalter—Northern, at any rate—in the Hunterian collection at Glasgow, which devotes three pages to the story and shows the following scenes: The angel bringing the palm to the Virgin; the Virgin showing it to the Apostles; the Death, with Christ standing over the bed, Apostles, and angels; the Funeral, with the Jew, the body laid in a tomb; angels bearing upward the shrouded body, with Christ standing by. A most remarkable set, hardly, I think, to be paralleled elsewhere for copiousness at this date, viz. not later than 1170.

I divert for a moment from England to mention one Italo-Byzantine work, a splendid mosaic, of 1143 in the Martorana church at Palermo, of the Death: all here, with the inscriptions, is Greek: and, for France, an interesting sculptured tympanum from St. Pierre le Puellier at Bourges, not very late twelfth century, and the magnificent and epoch-making one at Senlis, which M. Mâle assigns to about 1185.

In the thirteenth and fourteenth centuries the examples are everywhere pretty numerous. We have the story in the Brailes Horae of Mr. Perrins, in as many as eleven scenes. One early fourteenth-century English Horae belonging to Mr. Yates Thompson, the Taymouth Horae, gives seven scenes, including one unusual one, viz. Peter baptizing the Jew who assaulted the *cortège*. In the

Lady Chapel at Ely is quite a prolix treatment of the Funeral procession and burial. At Dorchester the southern window of the presbytery has the Funeral procession carved on the transom and mullions, and no doubt had more of the story in the glass. This, I think, is not generally known.

It is, however, out of the question to catalogue all the examples. I will merely add out of piety that Henry VI had a special devotion to the Assumption: it was gratifying to him to find that the parish church of Eton was dedicated to the Assumption, and, indeed this fact contributed not a little to his choice of Eton as the site, first of a collegiate church with the same dedication, and then of a school. Eton Chapel was much adorned with pictures and images of the Assumption. The Funeral and Assumption were in our wall-paintings: the Assumption is on our common seal and is carved on Lupton's tower.

At King's, too, the last two windows of the old glass have the Death, Funeral, Assumption, and Coronation.

The last important section of our paintings is that which covers the greater part of the north wall, and has for its subject the Passion. Here I must again strictly limit myself to the domain of English wall-painting and again say that there is not, to my knowledge, anything abnormal in the treatment of any one of the subjects.

The Passion cycles in recorded English wall-painting are fairly numerous, but very few have survived. In the list I gave just now the most important members were Chalgrove, West Chilton, Easby, Pinvin, Llanwyddyn, Sarratt, Winchester, Winterbourne Dauntsey. To these I add for the Passion: Battle, Sussex: not to be seen; Baunton, Glouc.: over the chancel arch; Beddington, Surrey: destroyed: over chancel arch; North Cove, Suffolk: some remains; Little Easton, Essex: nothing; Fairsted, Essex: over chancel arch: the Last Supper, at least, is visible; Seething, Norfolk: recently uncovered; West Somerton, Norfolk.

Important pictures of the Last Supper were in two refectories, that of Eastbridge Hospital, Canterbury, not now visible, and of St. Martin's Priory, Dover.

It must remain uncertain how the Croughton cycle ended: whether with a scene at the Sepulchre or the Incredulity of Thomas, perhaps, and the Ascension; or with the Ascension and Pentecost. Two scenes there probably were, and not more than two.

I think you will excuse me from dwelling in detail on the two Lady Chapel paintings. Good as they are, they do not show—at least to my thinking—any such deviation from ordinary types as to call for exposition.

But upon my sins of omission due to ignorance as well as upon any positive mis-statements of which I may have been guilty I shall gratefully welcome comment.

IX—*Excavations at Chun Castle, in Penwith, Cornwall.* By E. THURLOW LEEDS,
Esq., M.A., F.S.A.

Read 11th February 1926

CHUN, Ch'un, Chyoon, or Chywoon, as it is variously spelt, is the most remarkable of all the Cornish hill-castles. It is tempting to derive the name from the castle itself (Chy-oon, house on the moor), and, if that is legitimate, in Borlase's day, when the inner walls still stood 15 ft. high and more, the name was very apt. The 'oon' portion of the name is still present in the adjacent Woon Gumpus Common.¹ Like Trencrom in Lelant, however, the castle probably took its name from the farm on which it stands.

It is curious that so striking an edifice did not attract more notice from earlier writers, but Dr. William Borlase, in 1769, is apparently the first to give any detailed description with a plan (fig. 1, *a*) in his *Antiquities of Cornwall*,² where he is at some pains to prove its Danish origin, an opinion perpetuated in Gough's *Camden* and by still later writers.

The castle has already formed the subject of a communication to this Society. In 1828 William Cotton sent a report describing the castle afresh. The report was accompanied by a plan (fig. 1, *b*)³ in which the author sought to amend Borlase's plan in certain particulars, especially in the arrangement of the interior divisions. In the report of the meeting of the Cambrian Archaeological Association in Cornwall in 1862⁴ these amendments were rejected by E. L. Barnwell in favour of Borlase's original plan (fig. 1, *c*). It would appear that some excavations were made at the same time, but no details are given. If so, little notice was taken of the finds, since conclusions based on the style of the architecture are used to arrive at a date even later than that upheld by Borlase.

In 1895 excavations were made in the castle by the Penzance Natural History and Antiquarian Society, under the direction of Mr. J. B. Cornish,⁵ who has informed me that he explored a section immediately south of the area marked c on the plan of this year's work. The sherds, sling-stones, and other finds are

¹ Surely a tautology which should be removed from the Ordnance maps.

² p. 347, pl. xxix.

³ *Archaeologia*, xxii, 301-3 and pl. xxix; *Gent. Mag.*, 1864, p. 441 ff.

⁴ *Arch. Cambr.*, 3rd ser., xi, 187.

⁵ *V.C.H. Cornwall*, i, 461. Traces of other excavations of unknown date are still visible in the southern half.

in the museum of the Penzance Society, but beyond the short notice in the *Victoria County History* no detailed account of these excavations has been published.

In 1924 I had occasion, in furtherance of certain archaeological investigations, to travel in the west of England, and among other famous monuments of Cornwall I paid a visit to Chun Castle, my curiosity having been particularly aroused by the deep impression it had left upon Professor A. H. Sayce, one which in his conversations with me clearly went far beyond the brief mention of the castle in his *Reminiscences*.¹ The resemblances to foreign fortresses like

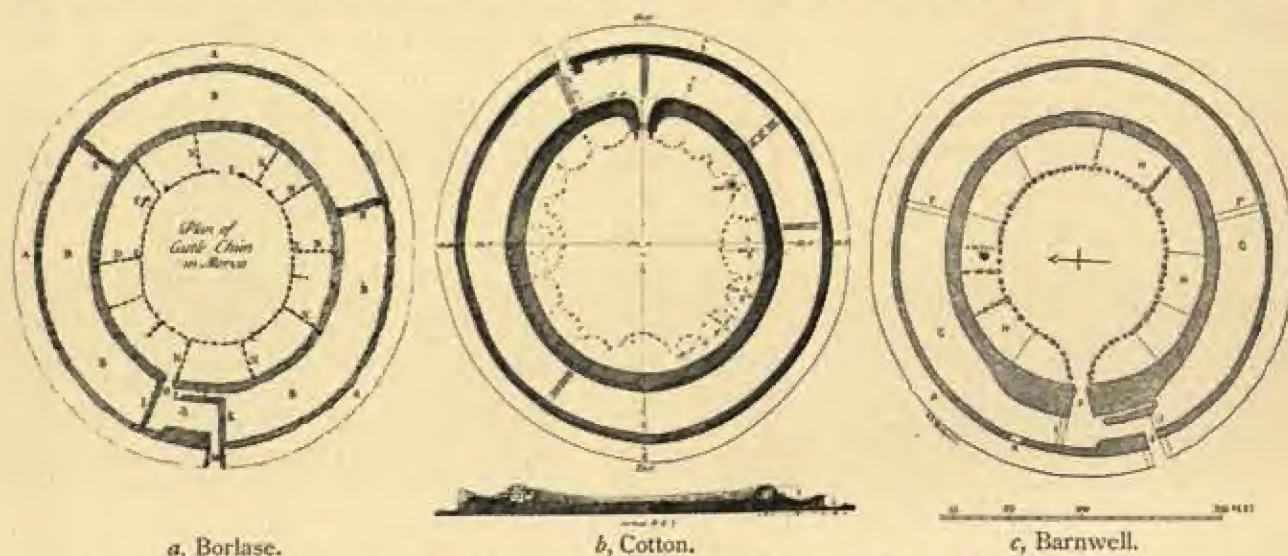


Fig. 1. Chun Castle: plans of Borlase, Cotton, and Barnwell.

two seen by him at Ali Agha, near Myrina, Asia Minor, which it recalled to him, were repeated in my case, but, as will be seen, with indications of connexions with a region in closer touch with Cornwall than the eastern Mediterranean, and, to put the matter briefly, I sought and obtained permission from the owner, Dr. H. Rashleigh, and of the tenant, Mr. N. Matthews, and, having enlisted the aid of several friends, in the latter half of August of last year, I conducted a short campaign.

Before describing the actual work, I wish to record my deep gratitude for the support which I received from various quarters. First, to this Society for the generous grant-in-aid which it contributed towards the expenses of the excavations; secondly, to Canon H. R. Jennings, of Madron, and to Canon Thomas Taylor, F.S.A., of St. Just, one of our local secretaries for Cornwall. Without their preliminary assistance in placing their local knowledge so readily at my disposal, I could hardly have begun operations.

¹ p. 203.

In the actual work I was joined by the Rev. C. Overy, M.A., by Messrs. R. T. Lattey, M.A., and C. A. R. Radford, B.A., and by three excellent labourers recommended by Canon Taylor. Mr. Overy undertook to re-survey the whole site with a view to checking and testing the earlier plans. He has contributed the plan and section of the castle, as well as a note on early tin-working. To Mr. Radford, who had already for some time past been making a special



Fig. 2. Sketch-map of the district.

study of the Iron Age in Devon and Cornwall, I am particularly indebted for much knowledge of local archaeological material. Many of the conclusions put forward at the end of this report are the result of consultations with him.

Mr. C. E. D. Nicholls, a student from Leeds University, also Dr. Favell, of Penberth, and a friend kindly lent me their aid on various days.

The task we set ourselves was, first, to ascertain the nature of the outer ditch and of the space between the two walls, as well as that of the walls themselves; secondly, that of the area immediately in front of the well; thirdly, to clear one of the house-areas, using such time as remained for other points which seemed worth investigating.

The situation (fig. 2).

The castle stands on the summit of a large rounded hill at 709 ft. above O. D. level. On the north and east sides the hill drops sharply to Chyoon and Bosullow

farms, with a low neck of moorland between joining the hill to Carn Downs. On the south and south-west the slopes are less pronounced, where the moor runs out into Woon Gumpus Common to rise once more towards the western spur of Boswens Hill and Carn Kenidzhek, while on the west the ground drops slowly past Chun Quoit to the cliffs $1\frac{1}{2}$ to 2 miles away.

The situation commands the immediate neighbourhood and a wide view eastwards down the valley, at the head of which it lies, past Trewryn Round and Castle Horneck across Mount's Bay between Penzance and Paul to the Lizard, though St. Michael's Mount is hidden by a spur above Madron. Westwards the Scillies are visible in clear weather on the horizon. But from north to north-east the distant outlook is blocked by the higher summits of White Down and Carn Galva, and the long spur on which the disused mine-building of Ding Dong forms a prominent landmark. Just west of Ding Dong the stone circle known as 'the Nine Maidens' is visible on the sky-line. Southward, too, all distance is hidden from view by the twin breasts of Boswens Hill and in part by the fantastic rocks which top Kenidzhek.

In spite of this the castle occupies a position of some importance astride a trackway, to whose great antiquity the numerous stone circles, barrows, prehistoric villages, standing stones, and at least three dolmens still bear witness. It is still known as the St. Ives Road, though in many places it is no more than a moorland track. Mr. Matthews described its course as mounting from St. Ives, through Stennack, past Towednack, across Lady Down and past the head of the Try valley under Mulfra Hill to the Nine Maidens. Thence it swings under the lea of White Down, past Men Scryfa and the Men-an-Tol to Carn Downs, and up by Bosulow Trehyllys to the foot of Chun.

From this point, according to Mr. Matthews, it passed over Carn Kenidzhek to Tregaseal, and thence towards Sennen and Land's End by Chapel Carn Brea, but it would seem more probable that the way divided round Chun, with a westerly track running past Chun Quoit to Tregaseal and an easterly passing over Botrea Hill and across by Bartinney, thus keeping to the high ground all the way to Sennen and Maen.

The position of the castle was so admirably chosen as to render it immune in fine weather from unexpected attack, since at no point could an enemy approach unseen nearer than several hundred yards. Some other factor must have called into being the enormous strength of the walls and general defences, and this may possibly have been in part the easy approach to the summit of the hill, which on the Woon Gumpus side rises but little above the general level of the moor, but also in part the constant liability to sudden envelopment in sea-fog, an occurrence which we ourselves, even in a fortnight in August, experienced on several occasions.



Fig. 1. Chun Quoit



Fig. 2. Chun Castle from WSW.; showing 'postern' and inner gate



Fig. 3. Chun Castle : main entrance with inner wall behind



Fig. 4. Chun Castle: inner ditch looking N., S. of main entrance; base of curtain-wall on right; inner wall behind; traverse N. of inner gate in centre; post of 'postern' on left

Published by the Society of Antiquaries of London, 1927



Fig. 1. Chun Castle, inner gate: N. side exterior



Fig. 2. Croftoc: interior of hut with large miller in centre



Fig. 3. Chun Castle, furnaces: inner gate in right background



Fig. 4. Chun Castle: House B looking towards main gate across furnaces

The plan and general construction.

As will be clearly seen from the results of the new survey (figs. 3 and 4) the castle is roughly circular in plan with an outer and inner wall, and with corresponding outer and inner ditches.

Access to the interior of the castle was apparently confined to a strategically arranged system of gates on the west side overlooking Chun Quoit (pl. XLIX, fig. 1). In the south-west quadrant a causeway led across the outer ditch through the outer gate (pl. XLIX, fig. 3) and then bending sharply northwards passed between the two walls for some 40 ft., flanked on the right hand by a curtain-wall (pl. XLIX, fig. 4) before it swung eastwards through the inner gate (pl. I, fig. 1), to which additional strength was given by a 'bottle-neck' through the massive thickness of the inner wall as well as by curtain-walls beyond on the inside of the gate (see fig. 3).

A large orthostat in the outer wall, a little north of the axis of the inner gate (pl. XLIX, figs. 2 and 4) marks the position of the postern-gate mentioned in all the earlier accounts. The exact relation of this gate to the adjacent ditches and the main system of gates still remains to be determined.

Not only the intricate entrance, but also the character of the masonry attests the strength of this fortress, since the walls are faced with polygonal blocks of granite, set with an inward batter and bonded into the heart of the wall, which was filled up with masses of smaller blocks.

The inner area was divided up into a ring of buildings around an open space. Of the walls of these buildings, constructed of large orthostats with smaller interstitial masonry, as in the huts at Croftoe below the hill (pl. I, fig. 2), but little now remains. Some indication of the positions of the walls is still afforded by lines of large blocks, but the form and relative arrangement of the buildings themselves are, as will be realized, by no means so well defined as earlier accounts of the site would give us to believe.

The outer ditch (figs. 3 and 4, c-D).

Excavations in this ditch alongside the causeway leading to the main entrance on its southern side revealed the following section. From the edge of the moor, some 25 ft. from the outer wall, the ground slopes for about 6 ft. to 4½ ft. below datum¹ at the outer edge of the outer ditch. This is constructed of

¹ The datum level selected, from which all ascertained levels were reckoned, is the approximate level of the entrance, that is to say at 4 ft. 6 in. below the small horizontal platform which marks the inner face of the northern post of the inner gateway.

All measurements were referred to a line pegged out from a point midway between the inner faces of the posts of the inner gateway and making an angle of 7° 22' to the north of the line to Ding Dong mine-stack from this point, that is on a line with geographic bearing, North, 71° 58' East. The axial line of the castle is about five degrees more southerly, i.e. approximately North 77° East.

CHUN CASTLE AUGUST, 1925.

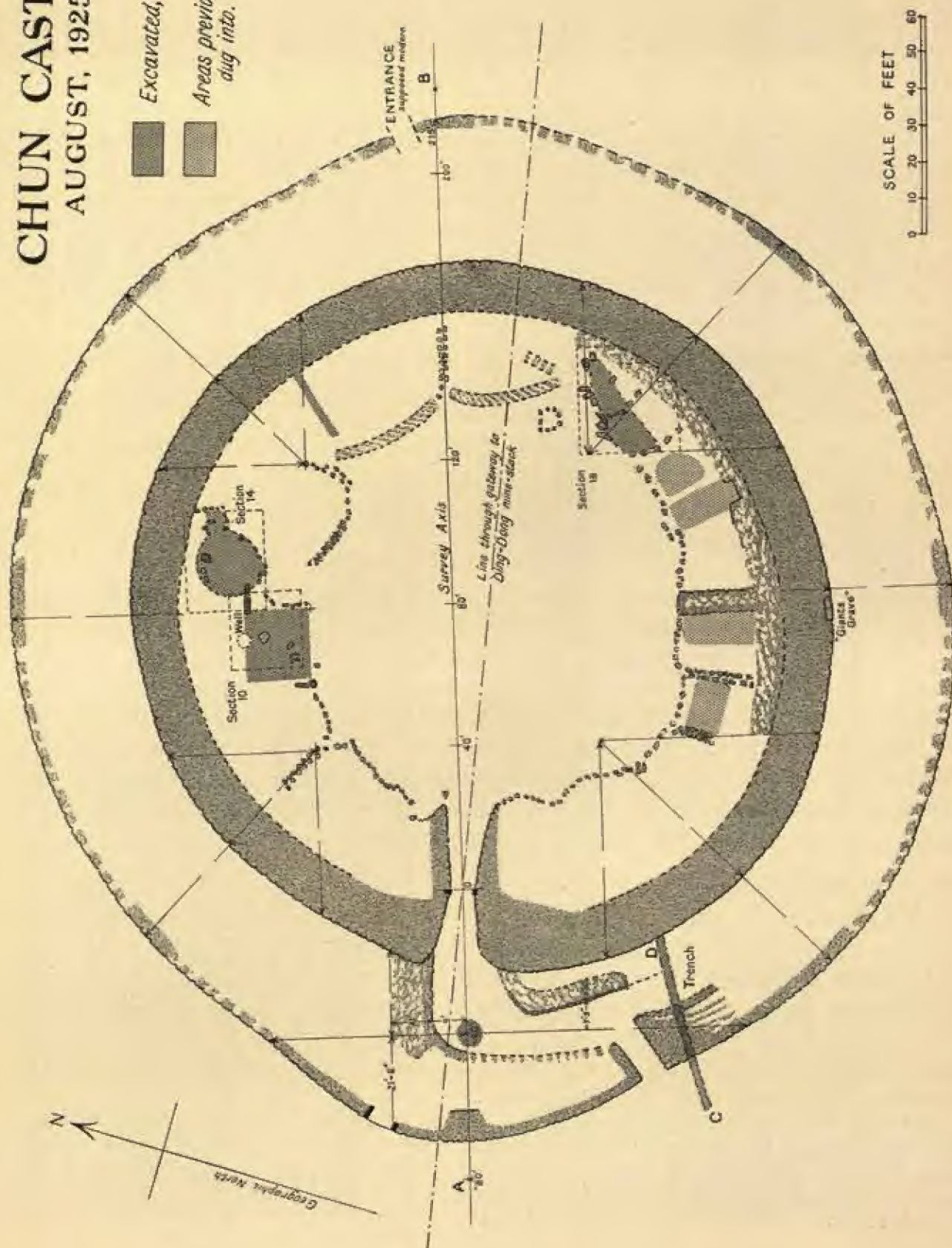
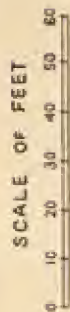


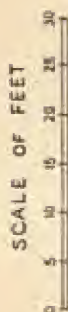
Fig. 3. Plan of Chun Castle, Cornwall.



Section on Survey Axis A-B.



Trench Section C-D.



CHUN CASTLE

AUGUST, 1925

Profiles & Section

Fig. 4. Chun Castle : profiles and section.

dry walling built almost vertical, and packed behind with rubble. From the foot of the wall, 6.39 ft. below datum, the floor of the ditch had a rab¹ bottom and, so far as could be judged without widening the trench in order to remove huge blocks which had fallen into the ditch from the outer wall, was practically flat. On its inner edge was a wall, a little over 1½ ft. high, built of faced blocks at an angle of 45° and packed behind with rab. Two feet from the outer edge of the wall and some 9 in. higher lay the footing of the outer wall, constructed of small stones, 9 in. thick.

In Borlase's plan a stone wall is indicated lining each side of the causeway across the ditch. In later plans it is no more than suggested. Traces of stones set at an angle to the footing of the outer wall may indicate the beginning of a former parapet.

The outer wall and inner ditch.

In Borlase's day this wall was still 10 ft. high, but, as now preserved at the end of the section described above, it stands no more than 5½ ft. above the footing. It inclines inwards some 6 in. in that height. It measures 3 ft. in thickness at the point investigated and is backed on the inner side by a rab slope 10 ft. wide, falling about 1½ ft. from the inner side of the outer wall (as now preserved) to the outer edge of the inner ditch, which is faced with huge single flat-faced blocks of stone set at an angle of 45°. The bottom of the ditch itself, starting from a point about 15 ft. from the outer face of the outer wall, lies at this point 4½ ft. below datum. It measures 19 ft. in width, with a rab bottom rising to 3½ ft. below datum against the inner wall, from the base of which a footing of small blocks projects 1 ft. into the ditch. In excavating this ditch a spindle-whorl of soft red pottery was found at a depth of 21 in. from the surface.

Across the inner ditch Borlase figures three traverses in addition to those on the south side of the outer gate and on the north side of the inner entrance. They are repeated on subsequent plans, but all search for them was unavailing. It is possible that their remains are now obscured by debris from the inner wall. Even of the traverse on the southern side of the main entrance no trace now remains, but its former existence is clearly indicated by the survival of the basal layer of a curtain-wall, its outer side 10 ft. from the inner wall, running parallel to that wall from the south side of the outer gate towards the southern corner of the inner gate. As now preserved it measures some 20 ft., and its northern end curves round to meet the corner of the inner gateway.

On the north side of this gateway remains of the traverse indicated in the older plans are still visible. It must have been originally about 15 ft. wide and projected some 10 ft. from the northern corner of the gateway; thereafter its

¹ Rab is the name given to a yellow marly layer which underlies the humus.

face curves round to a line parallel to the curtain-wall on the southern side of the gateway and links up with the northern inner corner of the outer gate.

Opposite the entrance of the inner gate we investigated a hole in front of the base of the inner edge of the outer wall. It showed signs of having been opened before, but on removing the stones with which it was filled we discovered what appeared to be a narrow gully, about 3 ft. deep and 1 ft. wide, running from the outer wall towards the inner gateway. Time did not allow us to follow it up, but its trend seemed to point towards a large hole just inside the gate on the south side. This, too, seems to have been opened previously, and was somewhat indeterminate in character, but we thought we could detect traces of a similar gully which ran in under the wall behind the southern gate-post. Its entrance into the wall was covered by a large slab, some 2 ft. above the bottom of the hole and about on a level with the surface of the interior of the castle. Although some 2 ft. underneath the wall its further course was blocked with debris, Mr. J. Jenkin, of Croftoe, and Mr. Matthews spontaneously compared it to a 'bolt', the local name for a drain underneath a gateway. If it was really such, it must have formed part of a drainage-system for leading away the water which in wet weather rises to a level little more than 2 ft. below the present surface, and therefore still closer to the surface at the time of the building and occupation of the castle.

There is a local tradition, which is still repeated, that a paved way led from Chun Castle down to the hut-cluster marked on the survey-maps as Bosulow Trehyllys, about half a mile north-east. This way—the idea of paving may have arisen from the nature of the granite which here lies in slabs on the surface of the moor—follows the parish boundary between Morvah and Madron into the St. Ives Road, to which reference has previously been made. *At the point at which it starts from Chun Castle there is now a gap in the outer wall, but whether this is due to later demolition of the wall, or is original, only minute investigation could determine. Certainly there is not the least sign of any entrance through the inner wall on this side, like that on the west side, unless some stepped slabs against the inner face of the wall, at the point where the survey-line crosses the wall, point to the former existence of a postern-gate. It is, however, hardly probable that, had such a gate existed, Borlase would have failed to note it at a time when the wall was still 15 ft. high.

The inner wall.

When Dr. Borlase described Chun Castle in 1769, he estimated the height of the wall to be 15 ft. Since his day, as will be seen, the wall has suffered sadly. In the first half of the nineteenth century the castle became a stone-quarry to supply the needs of Penzance and its neighbourhood, and

I have been informed that material was carried from Chun at different times to pave Penzance, and to build Madron Workhouse. The result is that the wall now stands no more than 3 to 4 ft. high, and things are even worse than that. If the process of 'stone-quarrying' had merely involved removal of the wall layer by layer as required, the circuit would still have remained well defined, but it is clear that either the demolition was carried out far in advance of all prospective requirements of stone, or that large masses of smaller blocks were thrown aside in the process of obtaining the larger blocks which had been used in the construction of the wall.

The result, in any case, has been that at least one-third of the width of the inner ditch is nothing but a disorderly heap of debris piled up against the face of the wall, entirely concealing it from view. It is now visible only in the region of the gate and in one or two places where earlier investigations have cleared a way through the debris up to the face of the wall.

The width of the wall at its present upper level varies from 14 ft. to 15 ft. This differs from Borlase's measurement of 12 ft. by 2 ft. to 3 ft. The discrepancy is perhaps accounted for by the fact that examination of many of the larger blocks, e.g. 'the Giant's Grave', a huge block, 8½ ft. long, 2 ft. wide, and 1 ft. thick, on the southern side of the castle (see plan, fig. 3), showed that these had a marked batter on their face which must have corresponded to a gentle inclination of the wall from its foot. This inclination is hardly to be detected now, but in a height of 15 ft., as in Borlase's day, must have been appreciable enough to account for the lesser width recorded by him. To judge from such remains as still exist, the wall would seem to have had bonding layers of larger blocks at various levels. Such a layer is still to be seen about 2 ft. from the foot of the wall on the north side of the gateway (pl. I, fig. 1), and allows one to realize the care and skill with which the stones were fitted together.

The interior of the wall was apparently filled up with small material to which the outer facing was secured by the inward depth of the bonding layers (see plan of the stones in the north wall of the gateway, fig. 5).

We could discover no warrant for the thickening of the wall on either side of the gate as depicted in Barnwell's plan. The depth of the gateway from its outer corner to the inner end of the large block within the gate is 21 ft. This is certainly more than the average width of the wall, but any additional thickness that exists is in any case on the inside of the wall, since the outer face runs in an uninterrupted curve. Within the gateway the wall on the north side runs inward again to form the back of a circular hut. In fact Cotton's plan is by far the most correct. The offset, as at G in Barnwell's plan, is a pure figment.

The inner face of the wall is obscured throughout its length, not only by debris from the wall, but also from the huts, and all this debris has become

solidified by accumulated earth and bracken. Only extensive exploration of this face would reveal its exact construction. Some indications behind the well and the adjoining hut eastwards suggest that between the huts and the wall there may have been some kind of a platform, though its purpose against a wall of the height recorded by Borlase is difficult to understand.

At three points, roughly corresponding to north, east, and south, around the outer side of the wall are three small semicircular walls, some 3 ft. high and about 4 ft. in diameter, built up against the face of the wall, but without any

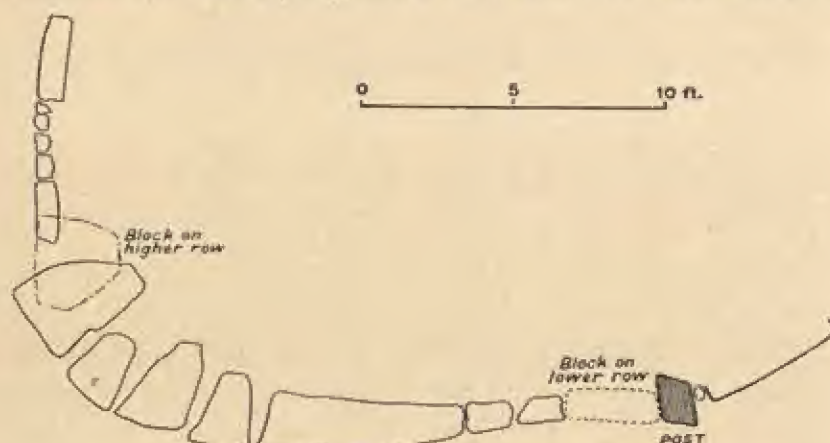


Fig. 5. Chun Castle: plan of blocks in north wall of inner gate.

trace of bonding with the wall itself. Clearly modern in appearance, they remained a mystery until Mr. Matthews declared them to have been erected for the 'preachings' of years gone by. He recollected the last preaching at Chun some forty years ago. On that occasion the preacher occupied the pulpit on the south side. The pulpit used varied according to the wind and weather. These pulpits are omitted from the plan.

In the course of our work we found it necessary to remove some of the fallen stones near the gate. These we hoisted out of the way on to the wall, but in such positions as prevented all possibility of their being confused with any portion of the original wall.

The houses.

Borlase, in his plan, divides the area around the inner side of the wall into eleven (or twelve?) chambers, bounded towards the interior of the castle by a wall parallel to the main wall. Barnwell,¹ commenting on Cotton's plan, states that both he and Britton² were wrong in imagining that the huts were circular in outline. In reality Cotton's plan is more correct than any before or afterwards.

¹ *Arch. Cambr.*, 3rd S., xi, 192.

² Britton and Brayley, *Beauties of England*, ii, 500.

The huts, where examined, proved to be undoubtedly of rounded plan, varying in size and outline, but the possibility that some inclined to be rectangular is not excluded.

Mr. Overy adds the following note :

'Without completely clearing the inner area of furze, bracken, and heather a detailed plotting of this is impossible. In certain cases, namely about the return of the gateway walls, around the excavated areas, and in the north-east and north-west sectors, the growth was cut down and the general trend of the walls plotted. Certain large stones obviously *in situ* have been accurately plotted and shown on the plan, but at the present date the positions of the walls are so much obscured by displacement of stones that no reliable information is to be gained from the above ground appearance. The scheme shown in Cotton's plan is much more in keeping with the general arrangement than that of Borlase, and its general accuracy is borne out by the one trench in which foundations were sought and proved.'

This trench (see figs. 3 and 6) was driven from a point close to the well, through into the adjoining house eastwards, and in it were found the foundations of two walls separated by an interval of 21 in. It is impossible to believe in a series of buildings with common party-walls. In this respect even Cotton's plan falls short of the mark. There is little doubt also that accurate plotting of the huts after excavation would prove that they were not even arranged in a regular ring, but that some projected farther from the main walls than others.

THE EXCAVATIONS

Apart from sections cut across the ditches and other minor trial trenches, three small areas within the castle were examined.

A. A rectangular plot, $17\frac{1}{2}$ ft. by $17\frac{1}{2}$ ft. (fig. 3, section 10), on the inner side of the well, the boundary towards the centre of the castle being a line between two stones, that on the west side obviously standing *in situ*, $42\frac{1}{2}$ ft. north of the baseline through the centre. After removal of some 6 in. of soil and bracken, an extensive conglomeration of stones was revealed, which after excavation proved to be the remains of a large furnace about 10 ft. long from east to west, and 5 ft. wide from north to south. It had been roughly constructed of blocks of various sizes built together with earth, and must originally have stood some $1\frac{1}{2}$ ft. high (fig. 6 and pl. I, fig. 3). It had three fire-holes, each with a flue leading out to the south side. A fourth flue led in from the eastern side through all the fire-holes in succession (see section A-B, fig. 6). Both the fire-holes and the flues were filled with black soil containing a large proportion of charcoal. Flues 1 and 2 were also found to have been plugged with rounded stones of suitable size.

At the south-east corner of the furnace was a small platform of flat stones

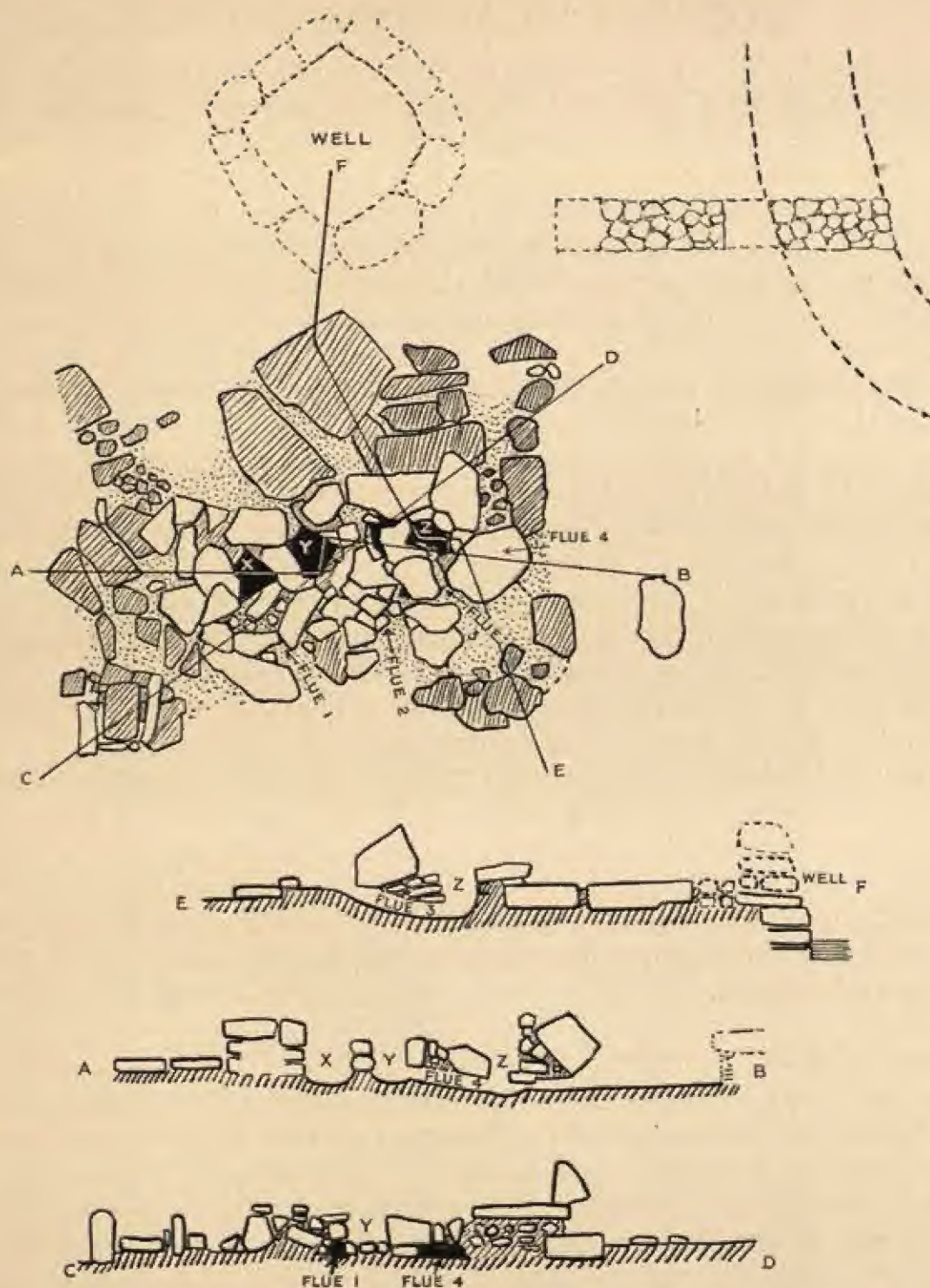


Fig. 6. Chun Castle : plan and sections of furnace (the difference in shading of some of the stones indicates different levels). Approximate scale $4\frac{1}{2}$ in. = 10 ft.

and earth, 6 in. high, on to which the flue (no. 3 on plan) of fire-hole z opened. The floor of the flues of 1, 2, and 4 lay 6 in. lower, just above the rab.

The floor at the west end and along the north side of the furnace, except for a small portion near the north-west corner, had been paved with large stones, those immediately in front of the well being of huge size and 6 in. or more thick. On the east and south sides the rab was covered by a thick layer of black soil, full of charcoal. From this layer most of the sherds found around the furnace came. A small quantity of slag was also found in and around the furnace.

At the south-west corner was a small construction in the nature of a flat trough, built up of stones and earth. A slab, 18 in. long by 10 in. wide, was surrounded on three sides by other slabs set on edge, forming a casing some 8 in. high. At the south end the trough was closed by two lower slabs, only rising about 2 in. higher than the level of the central slab. Outside the east side lay another flat slab. The purpose of these furnaces is conjectural, but the discovery of slag and tin-dross in the adjoining hut, as well as the entire absence of bones of any description, suggests that it may have been used for smelting rather than cooking. Charcoal was present in large quantities, both in the fire-holes and flues, as well as in the area in front of the flues. The material, where recognizable, consists of gorse and heather roots.

In Truro Museum is preserved a granite receptacle, square with rounded angles and hollowed out into a circular cavity. It measures some 4 in. high and 6 in. across (external measurement). It is of a type of which many specimens have been found from time to time in Cornwall. They are generally considered to have been used for casting cakes of tin. The specimen in question is labelled as coming from Chun Castle, but the circumstances and date of discovery are unknown.

B. *House, east of the well* (plan, fig. 3 section 14, and pl. I, fig. 4).

The outline of the house was elliptical, measuring 21 ft. from east to west, and $27\frac{1}{2}$ ft. from north to south, with its northern wall abutting on the main wall of the castle. No more than a few stones above ground could be definitely stated to be *in situ*, but in the trench cut through from the well into this house (*supra*, p. 216) it was proved that the foundation of the wall, $2\frac{3}{4}$ ft. thick, lay immediately below the blocks which at that point seemed to mark the circumference of the hut on the surface of the ground.

The entrance was still defined by two upright, roughly squared pillars, similar to those at the main gate, in the north-east quadrant of the house. Beyond the northernmost pillar was a second set-back half the width of the first, and beyond this again a large slab laid into the ground seemed to form the

threshold of a small recess up against the inner face of the castle wall, with what were probably steps up towards the wall.

On clearing the surface, the floor was found 6 in. below, roughly paved in certain portions, an arc of slabs in front of the doorway showing some care in their disposition. Towards the west side was a circular black patch, $2\frac{1}{2}$ ft. in diameter, and descending to a depth of 9 in., which may mark the position of the hearth at this level, though, as will be seen, the depth of charcoal can be otherwise explained. Absolutely nothing was found on this pavement except one worn sherd of bright red pottery.

Below the level of this pavement was revealed a layer of blackened soil some 4 in. thick, resting on another rough pavement. From this layer, and between the interstices of the stones, we recovered a small quantity of sherds, one a fragment of a large vessel, numerous oval beach-pebbles, a flat granite muller, and a large oval cake of tin-slag measuring $8\frac{1}{2}$ in. by $6\frac{1}{2}$ in., and $2\frac{1}{4}$ in. thick, and weighing 12 lb., besides pieces of iron slag. The pavement rested upon the rab, the total depth from the surface averaging $1\frac{1}{2}$ ft.

C. House in south-east quarter (plan, fig. 3 section 18).

In the last few days we turned our attention to the south-east quarter, choosing what appeared to be an untouched house next to that excavated by the Penzance Natural History Society in 1895, but we eventually found that it had been explored before. We had then no more than time enough to clear a portion of the adjoining house northwards.

This, like that previously explored, proved to have had rounded walls with an elongated oval outline, running almost to a point against the main wall north-eastwards. Its extreme length was about 32 ft. and its greatest (estimated) breadth, since we cleared only half its width, about 18 ft. It appeared to have been constructed with two chambers with a party-wall, 2 ft. thick, dividing it roughly in halves longitudinally.

In the southern chamber the rab was reached at 1 ft. 2 in. through a blackish layer, containing a few sherds, beach-pebbles, and a spindle-whorl of soft red ware, except in front of the party-wall, where there was a shallow pit, 10 in. deep and $2\frac{1}{2}$ ft. in diameter. In the northern chamber the rab lay at the same level for some 10 ft. northward of the party-wall, followed by a pit, some 5 ft. wide, extending to the north-east angle of the chamber. This angle is still marked by two large upright blocks set on a footing of smaller stones close up to the face of the main wall. Partly above the pit and partly over the rab beyond lay a patch of charcoal $5\frac{1}{2}$ ft. wide and 3 in. thick. In this chamber pottery was slightly more frequent; two fragments of red ware, parts of the rim of a largish

vessel, were found right in the angle against the wall and at the very base of the upright blocks.

The well (fig. 6).

The well, as visible from the top, is almost square in outline and $7\frac{1}{2}$ ft. wide. It is now filled up to within 2 ft. or 3 ft. of the surface with blocks of stone. Mr. Matthews informed me, however, that about twenty-five years ago, he and Mr. J. Jenkin cleaned it out entirely and found it to be 12 ft. deep with a square trough at the bottom about 2 ft. deep, cut out of the granite. From the bottom they recovered some small granite mullers.

THE FINDS

(A) *Pottery* (figs. 7 and 8).¹

As already noted, this consisted of sherds, usually quite small; a fragment measuring 4 in. by 6 in. is exceptionally large. In consequence the conclusions to be drawn from a study of the pottery are somewhat meagre. The following fabrics have been distinguished:

(1) Medium coarse, with some admixture of quartz; the paste is soft and is possibly indistinguishable from the second class, but it has been specially noted, since it includes two interesting pieces.

(2) Medium coarse to fine, with quartz grit; in colour dark to chestnut-brown; generally rather soft. The finer qualities show in some cases a highly burnished surface. To this class belong the majority of the sherds discovered. Only two varieties of decoration occurred: (*a*) incised horizontal bands, as on the largest sherd; (*b*) cordons. Sherds thus ornamented constitute most of the finer qualities.

(3) Medium coarse, with enough grit to give a sandy texture; the smoothed surface is speckled with mica; in colour black to brown, often with a high burnish. Most of the fragments are decorated; in fact it is to this class that the majority of the decorated sherds discovered belongs. A fragment of a rim was found in the wall of the house (B).

(4) Fine gritty ware, but with no free quartz; smoke-grey to black, and usually with well-levigated surface.

(5) Medium coarse to very fine bright red, with free quartz rather sparsely distributed in a soft paste in the firmer qualities. The finer qualities are almost a pure terra-cotta. When wet the sherds become very soft, the result being that an unabraded sherd is almost unknown. The one exception was a portion of a rim of the harder and grittier texture found at a low level in the north-east corner of C. A portion of a handle recalls those of some amphorae. Three

¹ The letters on these two figures refer to (*a*) the furnace; (*b*) round house (section 14); (*c*) and (*d*) north and south houses (section 18).

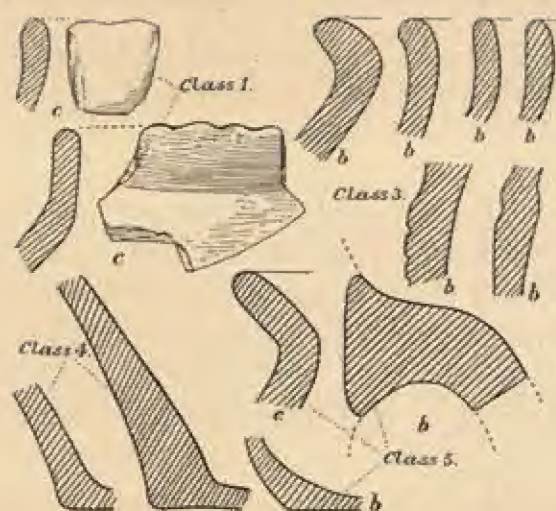


Fig. 7. Sections of pottery. (1)

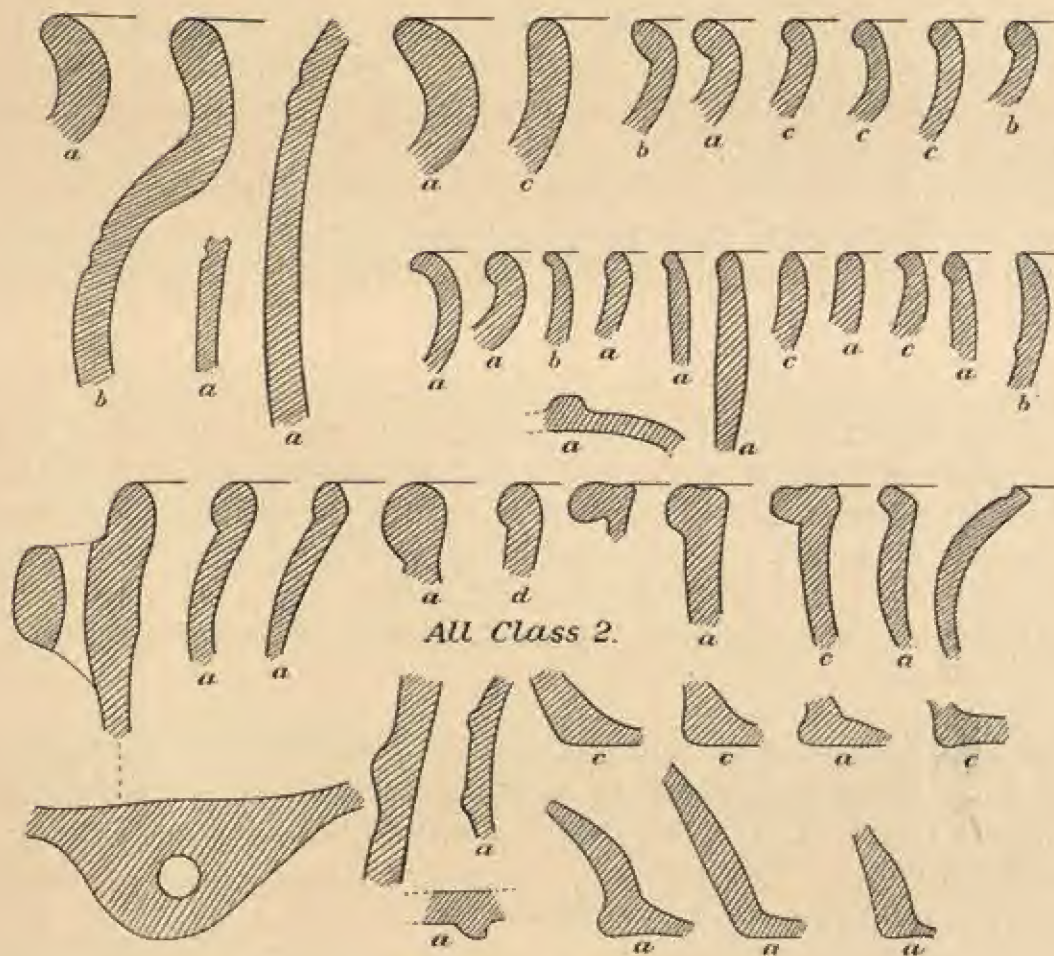


Fig. 8. Sections of pottery. (2)

spindle-whorls are all made of this ware. It has been found at all depths, one sherd in the piece of wall between the well and B.

In the matter of form, reconstruction is wellnigh impossible with such small sherds. The large fragment of class 2 must have belonged to a cooking-pot with a mouth about 10 in. in diameter. To the cordoned sherds may be allotted a base (class 4) which points to a pear-shaped cordoned vessel with a flat bottom,¹ while the sherd with thick horizontal handle (fig. 8) belonged to a squat, wide-mouthed vase. Figures 7 and 8 give sections of the rims according to their fabric, the letter indicating the part of the excavations from which they came.

The decoration of class 2 has already been noted. Class 1 shows an indented rim (fig. 7) which may be compared with Hengistbury, class A (Bushe-Fox, pl. xvi, 10), and a sherd with a design of slightly S-shaped incisions between horizontal lines (see *infra*, p. 232).

The main feature of the ornament of class 3 (see fig. 7) is the use of narrow bands consisting of two incised horizontal lines with diagonal hatching between. In one small fragment the band is in relief and the cross-hatching is straight. Apart from this, hatched triangles, and in one or two cases a curvilinear design (fig. 9), are employed.

Analogies to this pottery are not infrequent in Cornwall. The following sites have produced similar material: Chapel Uny,² Trencrom, Croftoe, and Chysauster Huts, Treveneague 'fogou', Tregear Rounds (St. Kew), Constantine Island, and others.

(B) *Stone.*

An ovoid muller of hornblende granite with one face worn flat with usage was found near the furnaces, and another of discoid form, $3\frac{1}{2}$ in. in diameter, came from below the pavement of B. Beach-pebbles of sizes suitable for sling-stones were constantly met with. These must have been brought up from the shore.

One large flake and a few small chips of flint offer a warning that the discovery of flint on such a site does not presuppose neolithic occupation.

(C) *Miscellanea.*

Three spindle-whorls of soft red pottery have already been mentioned. They are all of small size, about $1\frac{1}{4}$ in. in diameter and $\frac{1}{2}$ in. thick. A roughly circular sherd $1\frac{1}{2}$ in. in diameter has the appearance of having been cut to make a gaming-piece.

A small portion of a shale bracelet.

¹ A vase of this class from Sennen, near Land's End, figured by W. C. Borlase, *Naenia Cornubiae*, p. 230, is now in Truro Museum.

² The more accurate designation of this site is Carn Uny.

(D) *Metal.*

Iron. Part of a large-headed nail and a flat indeterminate fragment. From the bottom of and around the furnaces numerous pieces of slag were recovered. These on assay proved to contain sufficient metallic iron to be capable of separation by means of a magnet after crushing. Whether this is the 'Kiesel'

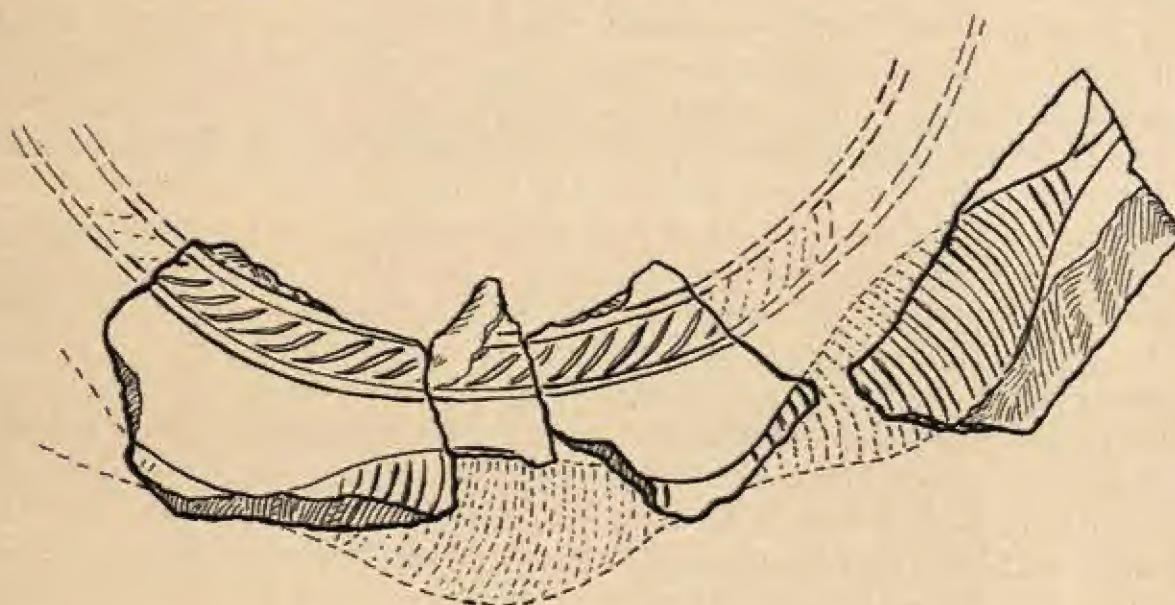


Fig. 9. Curvilinear design on pottery. (f)

iron found sometimes in association with tin, or ore from another source is doubtful.

Tin. For a note on the large cake of tin-slag found in the house east of the wall see p. 238 below.

EARLY ATLANTIC TRADE

Of early trade with the British Isles along the Atlantic coasts there is ample evidence going back at least to the beginning of the Bronze Age, if not beyond. Such discoveries as those of Irish gold lunulae in Brittany, a hoard of eight flat celts and a halberd-blade of Irish type in the bed of the Loire (Musée Dobrée, Nantes), not to speak of the enormous number of Bronze Age hoards in Brittany and at the mouth of the Garonne, all point to this trade in one direction or another. Connexions with Cornwall in particular are vouched for by a celt of pale green nephrite from Falmouth (Truro Museum), comparable to specimens from the chambered tumuli of Mané-er-Hroek and Tumiac, Morbihan, or elongated bronze celts with square sockets of a well-known French type, e.g. from Newlyn (Truro Museum) and Carn Brea, Redruth

(Ashmolean Museum),¹ and on the other side by the bronze hoards discovered along well-defined routes radiating from almost all the harbours of Brittany.

For the purposes of the present paper I confine myself to the question of the date at which this trade fell under Celtic control and the bearing which this event had upon the subsequent history of the British Isles. It is perhaps hazardous to speak of Celts in this connexion. Immigrations, if not invasions, would seem to have been a constant feature of the prehistory of these islands, and it may well be, in consequence, impossible to draw an exact line of demarcation between the pre-Celtic occupation and the coming of the Celts themselves. But there appears to be sufficient archaeological evidence to show that so marked a change, and one with peculiar features, came over south-western England during the early Iron Age that it can only be explained by postulating an invasion from the direction of western Gaul.

In 1913 Déchelette wrote that the date of the Celtic conquest of Britain and Iberia was uncertain, though probably anterior to the close of the Hallstatt period. That of Iberia seems to have begun as early as 500 B.C., and discoveries of recent years point to an invasion of Britain little if any later. But Déchelette makes, in addition, the following statement: 'Pour opérer leur débarquement en Angleterre, les Celtes ont dû se rendre maîtres de la basse vallée du Rhin'.² This statement may well be true of one part or one period of the Celtic invasions, but it is by no means certain that all or even the first entered Britain from the east. For, while there is every reason to believe that the Iron Age began in this country by 400 B.C. at latest, yet in south-eastern England, roughly speaking south-east of the line of the Icknield Way, the generality of the Iron Age material, particularly the pottery, dates from the last two centuries before our era—that from Eastbourne and Park Brow, Cissbury, being noteworthy exceptions—indicating that settlements of the continental Iron Age began late in that region.

Development of Atlantic trade in the Iron Age.

We may leave aside the stories of early Phoenician voyages from Gades, and pass at once to a period a century or so before the arrival of the Celts in the west of France, north-west Spain, and Portugal, when the Tartessians, apparently temporarily freed from the domination of Phoenicia, were ready to welcome the Phocaeans. These latter, it has been conjectured, endeavoured to obtain a share in the commerce beyond the Straits of Gibraltar, but, deterred from that quarter by the increasing pressure of Carthage, which soon took the

¹ W. Borlase *Antiquities of Cornwall*, 281, pl. xxiv. See O. G. S. Crawford, 'Prehistoric Trade between England and France' in *L'Anthropologie*, xxvi (1913), 641 ff.

² *Manuel*, ii, 573.

place of the mother-city of Tyre, turned their attention to the southern shores of France and founded there their colony of Massilia about 600 B. C.¹

It was no chance which led the Phocaeans to Massilia. The various oracles which would-be colonists were in the habit of consulting before embarking on their new enterprise undoubtedly played the role of intelligence-departments, political and commercial, for the ancient Greek world. Thus the Phocaeans were directed to the very quarter in which there was, in view of the Carthaginian control of the Straits, the greatest expectation of successfully tapping the tin-trade, which by this time must have been well known to the eastern Mediterranean, even though its exact source was still to some extent enveloped in obscurity.

The Massiliotes enjoyed only a brief spell of power, supported by their mother-city, but even in that short time they managed to extend their interests to the east coast of Spain and the Balearic Islands. For the present purpose it will suffice to note that in the face of the local power of the Elesuchi at Narbo² they succeeded in establishing an outpost at Agatha and a depot at Pyrene, through which points they were able to tap the trade which passed from the mouth of the Garonne through the Carcassonne gap to the Gulf of Lyons. They thus secured a hold on the two most important outlets of the Atlantic trade: the one, that just mentioned—the other, that which ascended the Loire from Corbilo, crossed to the Rhone and descended to its mouth. M. Jullian thinks the Phocaeans had, for a time at least, a post at Arles.

After the conquest of their mother-city by Cyrus, c. 540 B. C., the Phocaean colonists were necessarily thrown on their own resources and, though they retained their Greek spirit unaltered down to Roman times, they found their commerce no longer supported by a sea-power. This fact probably lies at the back of the stories of attacks by the natives and of the consequent precautions adopted by the colonists, as recorded not only of Massilia, but also of Emporiae.³ Thenceforth they must have found their interests becoming more and more identified with those of the natives, until at the time of the Roman advance towards Spain we find the Massiliotes, in the face of Scipio's inquiries about trade with the north-west, pretending complete ignorance.⁴

In the early days of Massilia (sixth century B. C.) one of its sons compiled the *Periplus* preserved in the *Ora Maritima* of Festus Avienus (fourth century A. D.).⁵ Although, however, Schulten holds that it records a voyage by the original Massiliote author, it does not seem clear that he made the whole voyage from the mouth of the Tagus himself. One may question that theory,

¹ C. Jullian, *Histoire de la Gaule*, i, 199.

² *Ibid.*, i, 213.

³ A. Schulten and P. Bosch, *Fontes Historiae Hispanicae*, i, 5-9.

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⁴ *Ibid.*, i, 215.

⁵ Strabo, iv, 190.

if only because it is evident that the statements about the course to the Oestrymnidae were based on information obtained from the Tartessians, and about places beyond that point on hearsay of the Tartessians collected from the inhabitants of north-west Gaul.¹ It seems hardly credible that, when Massilia had become acquainted with the trade across Gaul from the mouth of the Garonne, some colonist should not have managed to follow that route and bring back first-hand information about the western trade. Unfortunately, none such has come down to us in any Greek source.

We cannot tell whether the deterrent reports of the dangers to voyagers, interpolated from the account of Himilco's voyage (c. 500 B. C.) in lines 114-29 of Avienus' poem,² reports which were evidently deliberately spread by the Carthaginians, are to be taken as proof that the Carthaginians kept the route entirely in their own hands, or were, as the result of the Massiliotes or others having succeeded in slipping past, intended to warn off other adventurers.³ Pytheas' voyage about 320 B. C. may have been one such successful attempt.

Whether the Celts had arrived in north-west Spain before the *Periplus* was written is a matter of debate.⁴ But in any case their coming is placed in the sixth century B. C., so that at the time of Himilco's voyage they were not only established in the tin-bearing districts of Galicia and northern Portugal, but also along the west coast of Gaul. Not until some time later did they occupy the valley of the Rhone.

One thing is evident: the coming of the Celts did little to disturb the trade across Gaul to Massilia.⁵ In fact there is much to show that they soon realized the importance of the trade and adopted it for their own. The trade-routes right across Gaul were far older than Diodorus, as can be demonstrated by following the Bronze Age hoards, and the good relations of the natives with the Greek cities⁶ of the Mediterranean littoral of Gaul find proof in the rapid spread of coin-types from those cities in the last two centuries before our era, in the numerous wine-amphorae buried in graves at Toulouse,⁷ or that found along with an Italo-Greek bronze oenochoe and skillet (conceivably even Massiliote), a bronze disc with Celtic ornamentation, and lastly an anthropoid dagger (second century B. C.) at Châtillon-sur-Indre (Musée Dobrée, Nantes).

¹ A. Schulten and P. Bosch, *Fontes Historiae Hispanicae*, 11.

² *Ibid.*, 86-7.

³ Cf. Strabo, xvii, 802. The Phoenicians, to conceal their routes, sunk all strange vessels encountered round Sardinia and the Columns of Hercules.

⁴ Contrast with Déchelette, *Manuel*, ii, 570, Schulten, *op. cit.*, 87 and 93.

⁵ T. Rice Holmes, *Ancient Britain*, 507.

⁶ Cf. the testimony of Ephorus (Strabo, iv, 4-6) that the Celts were philohellenic.

⁷ *Revue Archéologique*, 1912, i, 13 and pl. E.

Connexions of Britain with Iberia.

At the time of the Periplus, as already noted, the normal voyage of the Tartessians did not apparently go beyond the Oestrymnidae, now usually placed in the archipelago of islands off the west coast of Finistère. They were, according to the Periplus (ll. 97-8), rich in tin and lead, which description would suit them well, if they served as collecting stations for British tin and lead from Cornwall and Somerset, or for Gaulish lead from Finistère itself, found at Huelgoat, a place situated on the main trackway from north-west Brittany to the Loire.

It is at any rate a remarkable fact that there does not seem to exist a particle of archaeological evidence to prove that the Tartessians, much less the Phoenicians, ever traded *directly* with Britain, after the beginning of the first millennium B.C.; and the same, I believe, can be said of France, though Desjardins refers to a Phoenician inscription found at Guérande, close to the mouth of the Loire.¹ It is all the more remarkable, because there is apparently something to warrant a direct trade from the Iberian peninsula to south-west Britain and Ireland. Evidence of such from the Bronze Age has already been noticed, and in the Iron Age there is evidence of a similar nature. In both cases, however, it is purely native, that is to say of Iberian origin, and contains nothing exotic, such as might be assigned to a Carthaginian source.² In this category must be placed the Iberic bronze statuette from Aust-on-Severn.³

The arrival of the Celts in north-west Spain can only have antedated by a short space their arrival in western Britain,⁴ so that it is only natural that there should be some resemblances in the culture of the two branches. We do not know whether it was chance or set purpose that led them to occupy in both cases the two principal tin-lands of the ancient western world, and that a third branch should be found in the less important tin-area between the Vilaine and the Loire.⁵

The tin-bearing region of north-west Spain runs from the coast of Galicia in the neighbourhood of Pontevedra in a diagonal line south-eastwards through the province of Orense in the neighbourhood of Verin, and thence across the

¹ *Géographie de la Gaule*, i, 289; T. Rice-Holmes, *Ancient Britain*, 512; see also, T. Taylor, *The Celtic Christianity of Cornwall*, 27.

² In this passage I refer only to the latter part of the Bronze Age after 1000 B.C.; and Iberian is used in its wide geographical sense without reference to its specialized application to a particular part of the inhabitants of the peninsula.

³ *Guide to Early Iron Age Antiquities* (2nd edit.), 148, fig. 173; *Proc. Soc. Ant.*, xxi, 374.

⁴ I am not concerned with possible arrivals of Celts before the Iron Age.

⁵ Aveneau de la Grancière, *Les Ferriers, ou Amas anciens de scories de fer dans le Morbihan* (Extrait de la *Revue Morbihannaise*, mai, 1913), p. 3.

province of Tras-os-Montes in north Portugal to the region around Zamora.¹ This last is perhaps the richest district, but how far these lodes were exploited in prehistoric times is questionable. Certainly Strabo (v, 153) says the tin was not found on the surface, but was dug up (τὸν δὲ καττίτερον οὐκ ἐπιπολῆς εὕρισκεσθαι φησίν, . . . ἀλλ' ὀρύττεσθαι), but that expression would equally well fit tin-streaming, the method unquestionably followed in ancient Cornwall, where the metal was obtained, not by means of shafts, but by removing the overburden to a depth sometimes as much as 30 ft.²

From the mouth of the Garonne both sources could be exploited, a fact which helps to explain Pytheas' statement that 'the northern parts of Iberia are more accessible towards Keltike than for those who sail by the ocean' ('τὰ προσαρκτικὰ μέρη τῆς Ἰβηρίας εὐπαροδώτερα εἶναι [τοῖς] πρὸς τὴν Κελτικὴν ἢ κατὰ τὸν ὠκεανὸν πλέουσι').³

Now it is noteworthy that the 'citanias' and 'castros', the fortified sites in north-west Spain and northern Portugal, such as La Guardia, Briteiros, Sabroso, Terroso, and many others, are situated at points of more or less easy access to the tin districts. La Guardia actually guards the mouth of the Minho.

Along both banks of the Douro from Barca de Alva to the junction of the Esla these 'castros' are very numerous, so much so that in the valley of the Aliste, the heart of the Zamora tin-region, their number is stated to exceed that of the modern inhabited sites.⁴ They form the exact counterpart of the string of fortresses in Cornwall, such as Chun, Trencrom, Castle-an-Dinas, Carn Brea, and Tregear.

Actually, the 'citanias' are on a much larger scale than anything like Chun. That at Briteiros excavated by Martins Sarmiento was in fact a township of three hectares (about 7½ acres) with several streets, but the polygonal style of the masonry and the circular shape of the houses⁵ conforms closely to that seen at Chun. The drawing of part of a house with a recess given by Cartailhac⁶ might well have served to illustrate the house east of the well at Chun, and, though there is none of the fine sculptured posts and lintels of Sabroso or Briteiros, yet the style of their architecture is repeated at Chun.

¹ W. C. Borlase, *Tin Mining in Spain* (1897).

² Sir William Boyd-Dawkins tells me that he believes that the tin ore worked by the ancient Cornish was found in the form of vertical ridges which were left by decomposition of the granite on either side at points where the tin-lodes came to the surface, but that some tin-washing in rivers was also practised is vouched for both by Diodorus (v, 153) and by the expression ποταμόρρυτον κασσίτερον ἐκ τῆς Κελτικῆς (Anonymi vulgo Scymni Chii, K. Müller's edit., i, 201, l. 165).

³ Dr. Rice Holmes (*Ancient Britain*, 495-6) apparently fails to see that the Massiliotes for whom Pytheas acted desired a route to the tin-lands free from Carthaginian interference.

⁴ *Boletín de la Real Sociedad Geográfica de Madrid*, xlv, 253.

⁵ E. Cartailhac, *Les Âges préhistoriques dans l'Espagne et dans le Portugal*, 273-4, 282-3.

⁶ *Ibid.*, fig. 408. Some of these houses had a stone in the centre, on which a central pillar was

Apart from these topographical and architectural resemblances, there exist other proofs of connexion between north-west Iberia and south-west England.

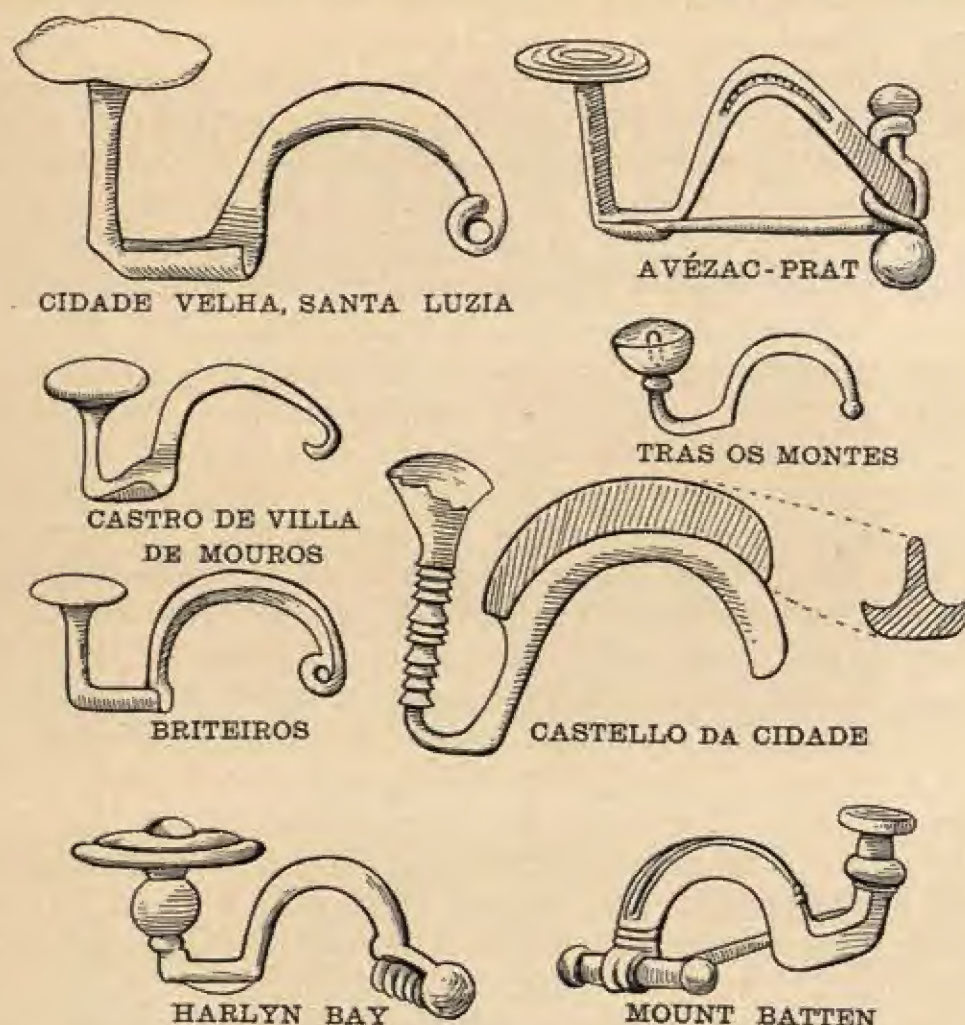


Fig. 10. Fibulae from Cornwall, N.W. Portugal, and France.

These come in every case from the southern counties, for the signs of intercourse are always from Iberia to Britain and not vice versa.

In the first place may be noted three fibulae: one from Mount Batten, Plymouth, and two from a grave at Harlyn Bay, Cornwall, both of unquestionable north-western Iberian origin¹ (fig. 10).

Identical fibulae come from Pontevedra,² Briteiros,³ Villa-de-Mouros, and supported. The presence of wooden supports was suspected at Croftoe (*J.R.I. Cornwall*, xxi, 171), and possibly even occurred at Chun itself (*V.C.H. Cornwall*, i, 461).

¹ The latter as already indicated by Sir Hercules Read (*Proc. Soc. Ant.*, xxi, 372-4).

² Collection of Señor Don Castro Sanpedro.

³ Museu Martins Sarmiento, Guimarães.

other places in Tras-os-Montes.¹ From the Plymouth find came also a fragment, it is doubtful whether of a pin or of a fibula. It consists of a thin bent bronze rod terminating in a flattish round knob from which springs a cupped finial. A somewhat similar finial, consisting of a deep cup from the centre of which springs a thin stalk, occurs on a fibula from Tras-os-Montes (Museu Etnológico, Lisbon), and another from near Castello de Vide.² This type of fibula also occurred in the Iron Age cemetery at Avézac-Prat, Hautes-Pyrénées,³ but its real habitat is rather north-west Spain and north Portugal.

In the second place, certain ceramic designs point in the same direction as the Mount Batten and Harlyn Bay fibulae. From the 'citanias' of Sabroso and Briteiros are here (fig. 11) illustrated sherds bearing zones of decoration, beginning as well-defined examples of the duck or water-fowl which the Celts took over from the art of early Italy. It makes its appearance in the Celtic world towards the close of the Hallstatt period, and at the very time when the Celts were moving forwards towards the Iberian peninsula. Their first inroad into the peninsula would seem to have been by way of the western passes of the Pyrenees, since it is not until somewhat later that they penetrated into the Rhone valley and the provinces at the eastern end of that chain. How long this duck-motive persisted in their decorative canon we are unable to say. A particularly good example of its use occurs on a fragment of a gold torque found in Galicia or Asturias (fig. 11).⁴ The exact date of these torques can only be conjectured, since they are unassociated discoveries, but it lies between 400 and 200 B.C., and the fragment with the ducks must be one of the earliest examples. Some of the sherds from Sabroso must therefore be regarded as contemporaneous with this fragment. The long persistence of the motive is illustrated by every shade in a transition from the duck in a life-like form down to the mere S-curves, to which the design is ultimately reduced.

Déchelette has drawn attention to the occurrence of a sherd with a row of ducks like those on one of the better examples from Sabroso.⁵ It came from the early Iron Age cemetery at Kervilré, Saint-Jean Trolimon, Finistère.

¹ *Portugalia*, ii, 15 ff., fig. 9.

² *O Archeólogo Português*, xxiv, pl. xxix, 24.

³ Déchelette, *Manuel*, ii, 685, fig. 262.

⁴ This fragment forms part of the splendid series of gold torques of Celtic manufacture found in north-west Spain, which I was privileged to see in the collection of Señor Don Ricardo Blanco y Cicerón, at Santiago de Compostella. Many of the complete specimens are already well known (*Boletín de la Comisión de Monumentos históricos de Orense*, 1906-7), but this important fragment has not received the notice it deserves. The illustration is based on a sketch made by the writer by kind permission of the owner in 1921.

⁵ *Manuel*, ii, fig. 667, after P. du Chatellier, *La poterie préhistorique et gauloise en Armorique*, pl. 17.

By the fortunate chance that the sherds from Sabroso comprise the whole history of the dissolution of the design, it becomes possible to place certain others (fig. 11) found in south-west England. One from Chun found in our ex-



Fig. 11. Pottery, &c., with 'duck' motive.

cavations (fig. 11, bottom row, right) is paralleled by another from the same site, obtained in 1895 and now in Penzance Museum; preserved there also is another specimen from Treveneague. Two sherds of this type are recorded from this site, one from the underground chamber ('fogou') itself, the other from the

rectangular ditch into which the chamber opened.¹ Yet another from Hengistbury is figured by Mr. Bushe-Fox (fig. 11).²

But the analogies of the pottery do not stop at this point. During a visit to Guimarães in 1921 I noted in the Museu Martins Sarmiento³ sherds, of which the first two examples in fig. 12 will give an adequate idea. No. 1 shows a corded band in relief slashed with diagonal incisions, producing a rope-like effect. No. 2 shows a hatched triangle below a decorated band, and below the triangle the duck almost at its last stage. The border on the first sherd can be paralleled in Portugal from Terroso (Oporto Museum), while in this country, on sherds from Constantine Island (Truro Museum) and on a closely analogous specimen from the lake-village at Meare (Meare, XI, Taunton Museum), a similar effect is produced;⁴ a border with a single line of incisions of the same kind, accompanied by ladder-like strips, was found in the fort at Tregear,⁵ while the combination of narrow band and triangle occurs on a sherd from Carn, Zennor (Truro Museum), and again on that from Meare XI. Further, the filling of the triangle on this last sherd with a feathered stalk also appears on a Sabroso sherd.

The coastwise links already suggested by the Kerviltré sherd are strengthened by the occurrence of a striking design in the Iberian peninsula, and again in Brittany. At present, in its simple form, it is unknown to the writer in this country. It consists of a series of bull's-eye circlets, bisected so as to leave the central spot, and set after bisection alternately so as to form a continuous chain, but always with a blank bar left between them. It occurs on sherds from Sabroso (fig. 12), and is also found among the decorative designs employed on painted pottery characteristic of the true Iberic culture in the east of Spain.⁶ On a gold torque of square section, and with the usual knobs of the Galician type (figs. 11 and 12), the same motive appears on two faces of the hoop (fig. 12), but in this case the bisected circlets are set opposite one another, the edge of the hoop forming the dividing bar. The alternative setting, but in a less complicated form without the median blank bar and with the spots transferred to the ends of the semicircle, is used on a vase from Mané-Roullard, near Trinité-

¹ J. T. Blight, *Account of the Exploration of Subterranean Chambers at Treveneague, in the Parish of St. Hilary, Cornwall* (Penzance Natural History and Antiquarian Society, 1867).

² J. P. Bushe-Fox, *Excavations at Hengistbury, Hants*, p. 59, pl. xiv, 10 (from a low level at site 25). The motive in its simplest (or final) form occurs on a fragment of a cup or bowl found in a pit-dwelling on Cleeve Hill (Brewer Coll., Cheltenham Museum), knowledge of which I owe to the Curator, Mr. G. Herdman.

³ For the facilities accorded to me for study on that occasion I desire to record my gratitude to the authorities of that museum.

⁴ I am indebted to Messrs. Bulleid and St. George Gray for permission to illustrate this sherd.

⁵ *Journ. Roy. Inst. Cornwall*, xvi. 72 ff., pl. 5, fig. 2.

⁶ P. Paris, *L'art de l'Espagne primitive*, ii, figs. 63, 64, 67, 71-3.

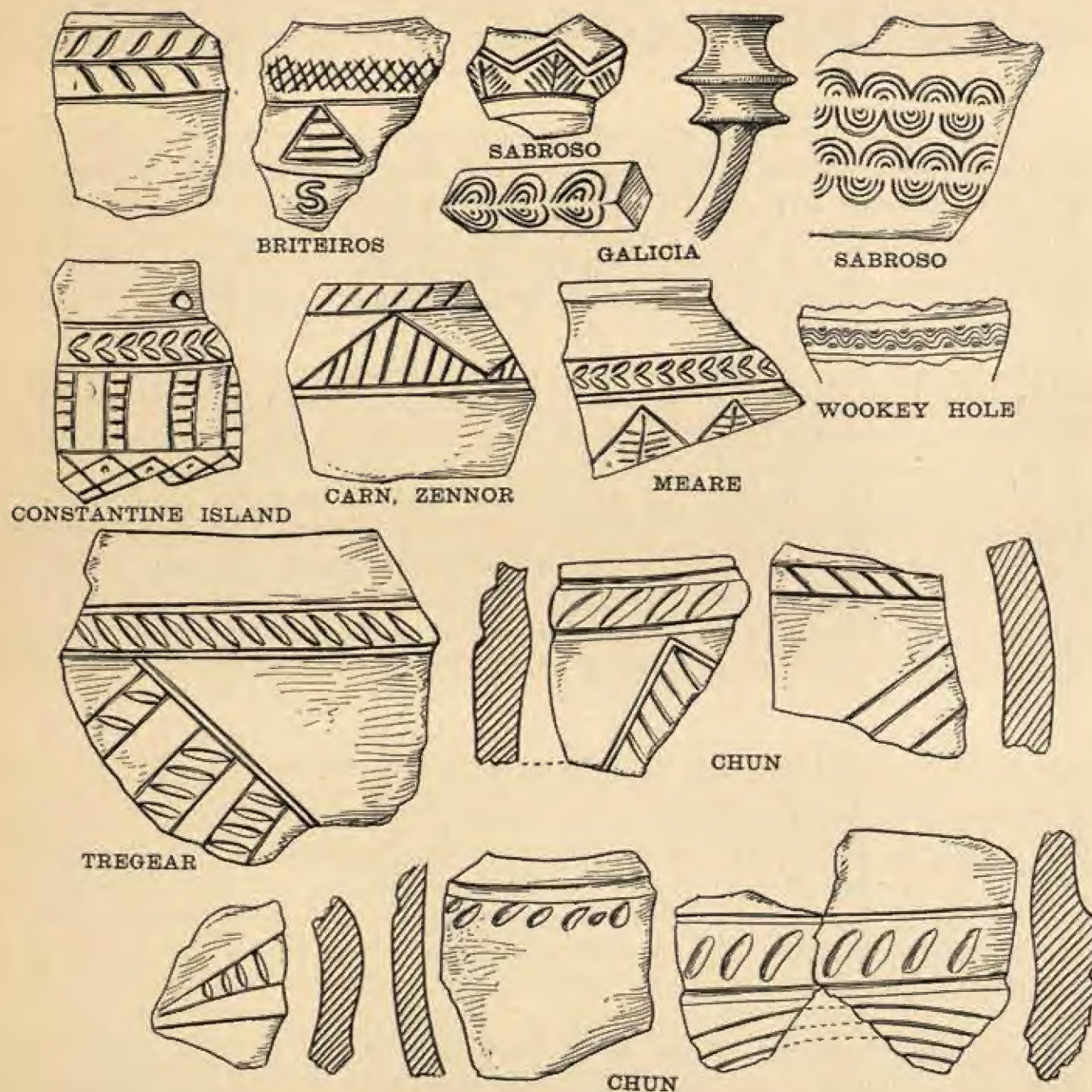


Fig. 12. Designs on pottery, &c., from N. Portugal and S.W. England.

sur-Mer, Morbihan;¹ and a further advance of the same design is met with on pottery from the lake-village at Glastonbury.²

Possibly such a wavy design as occurs on pottery from Wookey Hole

¹ Déchelette, *Manuel*, ii, fig. 666.

² *Ibid.*, fig. 668.

(fig. 12)¹ may be regarded as having been derived from the motive in question. My attention has also been called by Miss M. V. Taylor, F.S.A., to what appears to be a survival on late native black bowls, imitating Samian forms, from Jordan Hill, Weymouth.²

For comparison with motives prevalent in south-western England, a find in northern Portugal is of particular interest. I refer to the insufficiently known so-called treasure of Lebução, a place not far from Chaves, Tras-os-Montes,³ consisting of a gold torque of the type already described, and with similar ornamentation on the end of the knob, and a gold-ribbed armlet. The ribs of the armlet are divided up into panels which are filled with finely engraved ornament. Hardly two panels are alike, but among the large variety of designs are to be seen several which belonged to the Celtic canon before the development of the trumpet-scroll during the La Tène period. Thus not only the Greek fret or meander and the guilloche are present, but also a leaf-like design derived from interlocking circles, which occurs repeatedly on Late Celtic pottery in the west of England.⁴ An Irish link in the same chain is afforded by decorated bone 'knives' from Lough Crew.⁵

It is not here suggested that the resemblances are so close as to indicate a wholesale migration from Iberia to south-west Britain. Special features appear in the Iberian series to which no counterpart has as yet been found in this country. But that some close intercourse existed between these two Celtic regions is clear, even though it were by way of Brittany as an intermediary, and even so it has to be remembered that Kerviltré, where the duck-ornamented sherd was found, is situated in the extreme south-west of Finistère.

Connexions with southern Gaul.

Among the pottery from Chun there were several sherds and one fragment of a handle of a bright red, soft ware, totally foreign to the Iron Age ceramic of Britain. It is fairly evident that they are fragments of amphorae or other Mediterranean vessels, such as also occurred at Hengistbury.⁶ It is hardly conceivable that these western examples can have been imported except either by sea direct from the Mediterranean, as suggested by specimens found at La Guardia, or, in view of the extraordinarily numerous examples found in graves at Toulouse, from the mouth of the Garonne. Found at Chun at all depths, they must belong to the whole history of the fortress, so that there is

¹ *Archaeologia*, lxiv, 340, fig. 1, no. 3.

² *British Museum Guide to the Roman Antiquities of Great Britain* (1922), fig. 128.

³ *Portugalia*, ii, 1 ff., pls. 1 and 11.

⁴ A. Bulleid and H. St. G. Gray, *Lake Village*, ii, pl. lxxi, P 26, and pl. lxxxii, P 216.

⁵ *Journ. R. Soc. Ant. Ireland*, lv, 15 ff., especially figs. 9, 20, 28, 43, and 52.

⁶ J. P. Bushe-Fox, *op. cit.*, 21.

presumptive evidence that this ware was being imported before the Roman conquest of Spain set the Straits of Gibraltar free from Carthaginian interference.

Conclusion.

Enough has been said to show that the resemblances between the Celtic culture in north-west Iberia and in south-west Britain are very striking. The route by which the Celts entered Spain is certain, namely, by the western passes of the Pyrenees, from which they descended on the upper valleys of the Ebro and the Douro. In the former region they had by the fourth or third century B.C. come under the influence of the Iberi, as shown by their painted pottery, but in the west they remained unaffected. It is among this western branch that the system of 'castros' is most in evidence, and the distribution of these camps, added to the frequent traces of smelting observed within their walls, seems to indicate that the Celts, on their arrival in Aquitaine (or before), learnt the secret of the western tin trade, and proceeded to make capital out of their newly acquired knowledge.¹ They advanced into western Spain and established their domination by means of a series of fortresses. Those along the Douro, at the mouths of the Lima and the Minho (La Guardia) and near Pontevedra must have given them a firm hold on the seaward outlets of the trade.

Mr. Bushe-Fox has already shown that his discoveries at Hengistbury point to connexions with south-western France. It is but a little farther to seek connexions with north-west Spain,² and the knowledge of the important trade to be obtained there may have induced the Celts to follow up the same trade to its other source, south-west Britain.

It might be hazardous at present to say exactly from which continental quarter the Celtic immigrants into Cornwall came, since the system of 'castros' was common to the Celtic world, but the analogies of fibulae and pottery noted above suggest that the fortresses of Cornwall were constructed by a detachment from Iberia, who, as there, established themselves in strongholds from which they could command the tin and copper trade.³ They are but one part of

¹ *Boletín de la Real Sociedad Geográfica de Madrid*, xlv (1904), 255, as observed by Sr. Gomez-Moreno in the castros of the provinces of Avila, Salamanca, and Leon. The same holds good for Portugal. Gomez-Moreno adds, 'quizá ella (i. e. metalurgia) fué un principal móvil de colonización.'

² The tradition that the Milesians came to Ireland from Spain may also contain a larger element of truth than Professor Macalister (*Ireland in Pre-Celtic Times*, 265) suspects.

³ Apart from the discoveries at Chun and in the numerous hut-clusters and 'fogous' of Penwith, the close association of isolated finds of late Celtic objects in Cornwall with tin-workings is clearly shown by their distribution, as recorded in the *Victoria County History of Cornwall*, i, 371 and 373. In addition to the bronze mirror from Trelan Bahow in St. Keverne, the bronze collar from Trenoweth in Lelant, and coins from Carn Brea and Camborne, all well-known tin areas, a fibula inlaid with

a Celtic invasion which entered Britain from the south-west and penetrated into the heart of the country, establishing chains of forts from Cornwall, Devon, and Dorset, through Somerset and Wiltshire, into Gloucestershire, Oxfordshire, Berkshire, and adjacent midland counties. The immense preponderance of hill-top and promontory camps in these south-western counties as compared with the rest of England points to the same conclusion. Unquestionably some of them had been occupied as strongholds possibly as far back as 'neolithic times,'¹ but reoccupation was possible and is certain. Others, like Ham Hill, Birdlip, and Hunsbury, have been proved to date from the Iron Age, while others again have been presumed to be of the same period. There is little doubt that on exploration they would prove to belong to a single cultural region, characterized by La Tène I fibulae, by contracted burials, and by pottery of the Wookey Hole and Glastonbury type and their antecedents, as distinct from that of Swarling and Aylesford.

An interesting confirmation of this suggestion is furnished by the results of recent excavations in Leckhampton Camp, near Cheltenham, Gloucs. Mr. A. W. E. Paine has very kindly allowed me to forestall the publication of his discoveries there.² They were, like those at Chun, sparse, but the pottery might well have come as a whole from Chun itself, notably plain dark wares, and one with incised decoration, but even more so, numerous fragments of the soft red ware found at Chun. At Leckhampton certain elements common in central England make their appearance, namely, finger-tip pottery at the beginning of the scale, and at the end a few fragments of a smoke-grey line-burnished ware which may well be Belgic rather than Roman, and would only indicate the extent of the Belgic advance by the early part of the first century A.D. In any case, the red ware, both there and at Chun, is unaccompanied by wares belonging unmistakably to the period of the Roman occupation. Consequently this red ware must be put down as a Mediterranean import without the least trace of Roman intervention.

The impression one obtains from a study of pottery of this period found in

coral (?) was found in tin stream-works at Treloy in St. Columb Major, and a bronze collar along with a bowl of block tin in stream-works in St. Stephen in Brannell. To these must be added the La Tène I fibula from Redmore near St. Austell (in Sir John Evans's prehistoric collections recently presented to the Ashmolean Museum by Sir Arthur Evans) to which is attached the following interesting note:

'Found at Redmore, St. Austell, in Cornwall under 6 ft. of peat and 20 in. of river gravel. Beneath the sand lay another deposit of peat, 2½ ft. in thickness, which had been partially cut as fuel. Mixed with the cut blocks of this second peat deposit were the remains of a smelting hearth and pieces of tin-slag.'

¹ Cf. O. G. S. Crawford, *The Observer*, October 4th, 1925.

² Since published in *Trans. Bristol and Gloucs. Arch. Soc.*, xlvii, 104 ff.

Cornwall is that the decorated classes are either a little earlier than, or contemporaneous with, the earliest examples at Wookey Hole—that is to say, the occupation of fortresses like Chun, Tregear, and Trencrom; hut-clusters like Croftoe and Chysauster; and even subterranean dwellings ('fogous') like Chapel Uny¹ and Treveneague all date to at least the early half of the third century B.C. That would allow time for the gradual degradation of the duck-motive of north Portugal into its S-form, and would accord with the development of the Portuguese fibulae.

The enormous importance attached by the Celts to metallurgy a glance at the pages of Déchelette's *Manuel* will suffice to demonstrate. The suggestion that the Cornish camps are bound up with the command of the metal trade may find an echo in the Cotswolds. The number of camps in this latter region is quite remarkable, and indicates some particular attraction which drew the Celts on to that district. Further, it is noteworthy that the area of their distribution coincides with that of some of the finest and wealthiest villas of Roman Britain. Conceivably both camps and villas are, each in their own way, the expression of the power or wealth of the Cotswold flock-masters, whose descendants of the sixteenth century vied with one another in the size of their monumental brasses. But a second motive may have prompted occupation of these parts. Our knowledge of the sources of Late Celtic iron is very imperfect. It may be that the fortified camps of the Cotswolds, especially along their western edge, in conjunction with those in Monmouthshire, aimed also at securing a command of the iron deposits of the Forest of Dean.² The distribution of iron currency-bars strongly indicates this quarter as such a source, and a most important one.

It seems clear that the system of camps will prove to have had in the first place as much an economic as a military basis, but on the arrival of the Romans in this country, as in north-west Iberia, their military importance became for the moment so predominant that the Romans found themselves forced to drive their roads into the heart of these nests of camps, so as to simplify the process of

¹ Mr. G. Penrose, Curator of the Truro Museum, kindly allowed me to examine the collection of Iron Age sherds in his custody. Among them were several affixed to a board and labelled Chapel Uny. The incised pottery is unquestionably Celtic. In addition, there was one sherd of the red ware found at Chun. As there was nothing else which would in any way answer the description, I am inclined to believe that this fragment of red ware is that described by Borlase (*Proc. Soc. Ant.*, 2nd S., iv, 167) as possibly Samian. In support of this belief I may add that in all the collections of sherds from such sites as those enumerated above I have never seen a single fragment which could be recognized as unmistakably Roman.

² T. Rice Holmes, *op. cit.*, 251. The camps at intervals along the south shore of the Bristol Channel point to a sea-route up channel. The iron-stone at Hunsbury was probably of too low a grade for smelting at that period.

breaking down their military menace.¹ Such menace in western Cornwall was, however, negligible, and the Romans apparently, having once paraded their power, left the natives more or less undisturbed, to develop or continue their former commercial activities.

NOTE ON TIN ORE FOUND AT CHUN

The discovery of the large block of tin ore in the house contiguous to the well at Chun has a particular interest, as it furnishes one of the few authentic records of tin-dressing in Britain, for which a date can definitely be fixed in prehistoric times.²

The phrase 'tin mining' has been used without much discrimination in treating of the exploitation of Cornish tin, and without regard to the fact that there exists no certain evidence of 'mining' proper—that is to say, the working of a lode by means of shafts and galleries—having been conducted before the Middle Ages. On the other hand there is a considerable bulk of evidence from the tin areas, both of Devon and Cornwall, that excavation of tin lodes at the surface and of tin stone in detrital deposits dates back much earlier than the Roman occupation. With few exceptions the metalliferous lodes are on the margin of the granite area, in what is known as the metamorphic aureole, which separates that area from the slate through which the granite was intruded. Weathering of surface rock exposed the lodes in this aureole, and in other places when the lodes occur within the granite area; and the patches so exposed have been dug into in what is known as 'coffins' (large surface excavations extending to a depth of 30 ft., and resembling quarries). Although no proof exists of this method of extracting the ore having been practised in prehistoric times, presumptive evidence points to its practicability, and tradition agrees with the presumption. A much richer and much more easily available source of ore existed in the detrital deposits carried down from the exposed lodes in the course of land erosion, and deposited in the 'bottoms' of the streams traversing both granite and slate areas, both in a northerly and southerly direction, the former being the richer on account of their greater length and gentler gradient. Removal of alluvium down to a depth ranging from one or two to thirty feet was all that was required to expose deposits of 'tin stone' with a much higher

¹ The ultimate position is similar in Spain and Portugal. The following passage from M. Joulin's account of the Iron Age in southern Gaul and Iberia is well-nigh applicable to Britain:

'Les débris romains font entièrement défaut à Cabrera de Mataro, à Puig-Castelar et dans certaines Citánias du Minho. C'est une nouvelle preuve que l'un des premiers effets de la conquête a été l'abandon des agglomérations situées sur des lieux élevés à la création, dans les plaines voisines, de nouveaux centres habités, tel que *Iluro* près de Cabrera, *Betulo* près de Puig-de-Castelar, dont tous les vestiges sont romains' (*Rev. Arch.* (1911), i, 34).

² Another cake was found at Harlyn Bay and is now at Padstow.

average percentage of metal than that normally available from surface exposures, and much more easily manipulated. In these 'stream tin' deposits numerous remains have come to light which point to Cornish tin-streaming dating back as early as the Bronze Age, but the evidence is indicative only, and wanting in the matter of substantial proof.

Chun Castle stands within the granite area at the head of a moor which forms the water-parting between three several tin-streams, two at least of which were known to have been streamed for tin from remote antiquity. Caer Bran is in a like position, and Chapel Carn Brea similarly placed, while the two first are situated in areas where tin lodes crop up within the granite.

The amount of slag found in the 'furnace' partition of Chun Castle indicates the use of the furnaces for smelting. The large block of ore, 12 lb. in weight, when analysed, proved to consist of laminated layers of tin with interstitial patches of an antimony compound.¹ Mr. R. C. Spiller, F.G.S., of the Mineralogical Department of the Oxford University Museum, gives it as his opinion that the block bears no resemblance to any naturally occurring tin ore, but has the appearance of being a smelted deposit such as would collect at the bottom of a cavity in which smelting had taken place. It is, in fact, of just such a character as the residual slag which would collect in the bottom of the Chun furnaces, if the traditional primitive method of smelting by means of brushwood layers packed with tin stone and fired in a conical flue were followed out.

In the absence of the least vestige of material found in the Chun excavations to indicate later occupation and use, the association of datable material with furnaces and smelted tin fixes an authoritative date within the Celtic period for the dressing.

DISCUSSION

The Rev. CHARLES OVERY referred to the metallurgy of the district, and produced a specimen of tin assayed from the slag, evidencing 57 per cent. of pure metal. Similar buttons were found at the bottom of furnaces admittedly of the same age. The excavation had yielded the first trustworthy evidence of early working of tin in Britain. The iron found was possibly the kind that occurred with the tin-ore and came out as slag, being a recognized by-product (brown haematite). He was inclined to think the tin-workers were also engaged in iron-smelting. The camp was at a spot between three ancient areas of tin-streaming.

Mr. BUSHE-FOX had also, on a visit to Chun Castle, been struck with the importance of the site; and the paper had at last settled some important points. Twelve years ago he had, on slender evidence, put forward theories with regard to the occupation of Hengistbury, and was glad to find his view confirmed that the movement towards south-west Britain was from the west coast of France rather than from the Rhine. The north of Spain and Portugal, and the country north of the Pyrenees had been invaded by a people called the Celts, who were

¹ *Geological Survey Memoir*, 'Land's End District'. Antimony is recorded as occurring in the Crowns Mine, Botallack, but not elsewhere.

attracted by the tin; and he was inclined to believe that such good seamen would have gone as far as possible by sea. The account given by Diodorus of the transport of tin through Gaul confirmed that view. He regretted the absence of Mr. Radford, who had done much archaeological work in Cornwall.

Mr. REGINALD SMITH detected in the plan of Chun Castle some analogy to the brochs of Scotland, and remarked on the difference of Mr. Overy's survey from previous plans that had been published. The presence of a well suggested that the ditches might have been below water-level and so provided an additional defence; and the flanking entrance had been arranged to expose the right side, not the shield arm, of an approaching enemy. The nephrite celt described seemed to resemble a number found in England and Scotland, perhaps originally from Brittany; and the 'pie-crust' edging to one piece of pottery resembled that of an urn from Brittany that contained a hoard of local socketed celts, now in the British Museum. A bronze blade shown with several flat celts on the screen looked like an Irish halbert of the early Bronze Age. The pattern said to be derived from a row of birds appeared even on Anglo-Saxon pottery, and might have belonged to the common repertory of Europe; and the mention of Celtic ornament 'before the acanthus' implied that the Hallstatt people at least spoke that language, as the acanthus was adopted by the Celts in the fifth century B.C.

Mr. LITLEDALE thought the matter might be treated philologically. Certain words, such as 'basket', were common to Scotland, Wales, Brittany, and northern Spain, and might point to a racial connexion between peoples on that line.

The PRESIDENT pointed out the difference in dimensions between Chun Castle and the brochs, but thought the former was built by the indigenous population rather than any invaders. If intended to dominate the tin-field, the castle could only have been erected during the military occupation of the whole district. Labour and material in such quantity would not have been at the disposal of invaders. It was clear from Diodorus Siculus that the people of Cornwall were thoroughly civilized, and their widespread fortresses meant political development. The meeting would desire to thank Mr. Leeds for his contribution to prehistoric ethnography.

Mr. LEEDS agreed as to overland routes through south-west France, and thought the Loire route was used till blocked by the Veneti; but still held that forts like Chun Castle were the work of an invading people, who brought the amphorae which the natives would have boycotted. A certain type of pottery was found only in such camps, which extended as far inland as Northants.

X.—*The Excavation of a Tumulus at Lexden, Colchester.*
By PHILIP G. LAVER, Esq., F.S.A.

Read 21st January 1926

Just within the boundaries of the modern Lexden Park,¹ through which runs the innermost of the ancient defensive earthworks of Camulodunum, known in part of its course by the name of Blue Bell Grove, and formerly Hollow Way, lies the tumulus, the excavation of which in July and August 1924 is the subject of this paper. It lay within the great west field of the town,² which apparently was not made several till late in the seventeenth century. In 1758 it lay in Mr. B. Evans's paddock.³ In 1838 the field in which it then lay was called Round Field Hill, which was absorbed into the Park in 1860.⁴

It was known to Stukeley and is mentioned in his manuscripts, and several plans signed by him exist⁵ showing the site, one of which is dated 9th August 1758, but the fanciful labelling of it as 'Prasutagus' grave' is of course an exuberance of his imagination. Fired by such enthusiasm, Morant, the Essex historian, who was rector of the adjoining parish of St. Mary-at-the-Wall, and apparently collaborated with Stukeley, also made a plan giving substantially the same particulars.⁶ He does not, however, mention the tumulus in his *History of Colchester*, which had been published ten years before. The tumulus is not shown on Chapman and Andrée's map of 1777, nor on Mudge's first ordnance map. The Rev. Henry Jenkins, in describing some of the earthworks at Lexden, calls it a 'Beacon', and on the accompanying plan it is labelled 'Mount' and coloured a distinctive tint as a Roman erection.⁷ It is duly recorded in the Inventory drawn up by the Royal Commission on Historical Monuments in Essex,⁸ and the current O.S. maps show it.⁹

¹ Formed after 1750.

² Which apparently was here bounded on the west by the Hollow Way.

³ Stukeley's plan, Gough Collection, Bodleian.

⁴ Tithe Map, Lexden, 1838.

⁵ Gough Collection, Bodleian.

⁶ Dated 25th August 1758. Wire MSS., Colchester Museum. In this MS. Morant acknowledges help derived from a Dr. Mason.

⁷ *Arch.*, xxxix, 243.

⁸ Vol. iii, p. xxvii, and p. 74.

⁹ Against it appears 'Roman amphora and pottery found 1860'. The Director-General Ordnance Survey sends the following description: 'A slightly raised mound of circular form covered with fir

Attention was directed to the mound, however, in 1924 by its threatened destruction in connexion with building operations. The mound was scheduled under the Ancient Monuments Act, but as the land-owners were pressing for the immediate development of the estate, it was decided that the mound should be released from schedule, subject to its being thoroughly excavated. The work was carried out under the direction of my brother, H. E. Laver, and myself, and it is due to his unremitting care and attention throughout the whole period of excavation, that the work was brought to a successful termination.

Prior to excavation, the mound appeared to be circular with a maximum height of 9 ft. at the centre, and a diameter of about 100 ft. (pl. LI, fig. 2); it was topped by a large Wellingtonia which, until its destruction was sanctioned at a later stage, proved a serious obstacle to excavation. It was found, moreover, that the roots of this tree had forced their way through the mound itself into the underlying gravel, and, selecting the lining of the grave, had done much damage to the contents. Owing to this obstacle the preliminary work consisted of two long trenches, one from the east and one from the west, sinking to tunnels as they approached the centre, and it was not until the removal of the tree that the central grave could be approached from above.

The results of the excavation may be summarized as follows:

The mound was found to consist of the local gravel, and to be surrounded by a ditch (fig. 1). This ditch was cut at two points, on the east and west respectively. On the east side it was found to be $5\frac{1}{2}$ ft. across and $2\frac{1}{2}$ ft. deep, with a nearly semicircular section; on the west it was as much as 9 ft. across and 3 ft. in depth but of similar shape. The grave was found slightly to the west of the centre of the mound. It consisted of a large oval excavation 30 ft. long and 18 ft. broad, and the floor was on the average 7 ft. below the original surface, and 13 ft. 6 in. beneath the top of the mound. When the grave was reached it at once became clear that some part of it had previously been disturbed; the disturbed area was on the north side, and consisted of somewhat less than one-third of the whole grave-area. With this disturbed area I propose to deal briefly at the end of my remarks, and in the meantime I turn to that part of the grave which had every appearance of having remained hitherto undisturbed.

The original grave surface beneath the mound was represented by a black and other trees. In 1860 Roman remains were found in this tumulus consisting of an amphora, the neck and handle being broken, 2 ft. 9 in. high together with a quantity of fragments of Roman pottery.'

The excavation undertaken in 1924 showed that a superficial hole 20 ft. across and 4 ft. deep had been made in the top of the mound and filled with black soil in which a tree had been planted. It is possible that the amphora then discovered (now in the Colchester Museum) was associated with a secondary burial in the surface of the mound, since it is of markedly later type than any of the pottery found during the excavation here described.



Fig. 1. Fragments of amphorae from the Grave (about $\frac{1}{4}$)



Fig. 2. General view of the mound



Fig. 1. Fragment of cordoned vessel, site 19 ($\frac{1}{2}$)



Fig. 2. Fragments of butt-shaped beaker ($\frac{1}{2}$)



Fig. 3. Fragments of iron 'tyres' and swords ($\frac{1}{2}$)

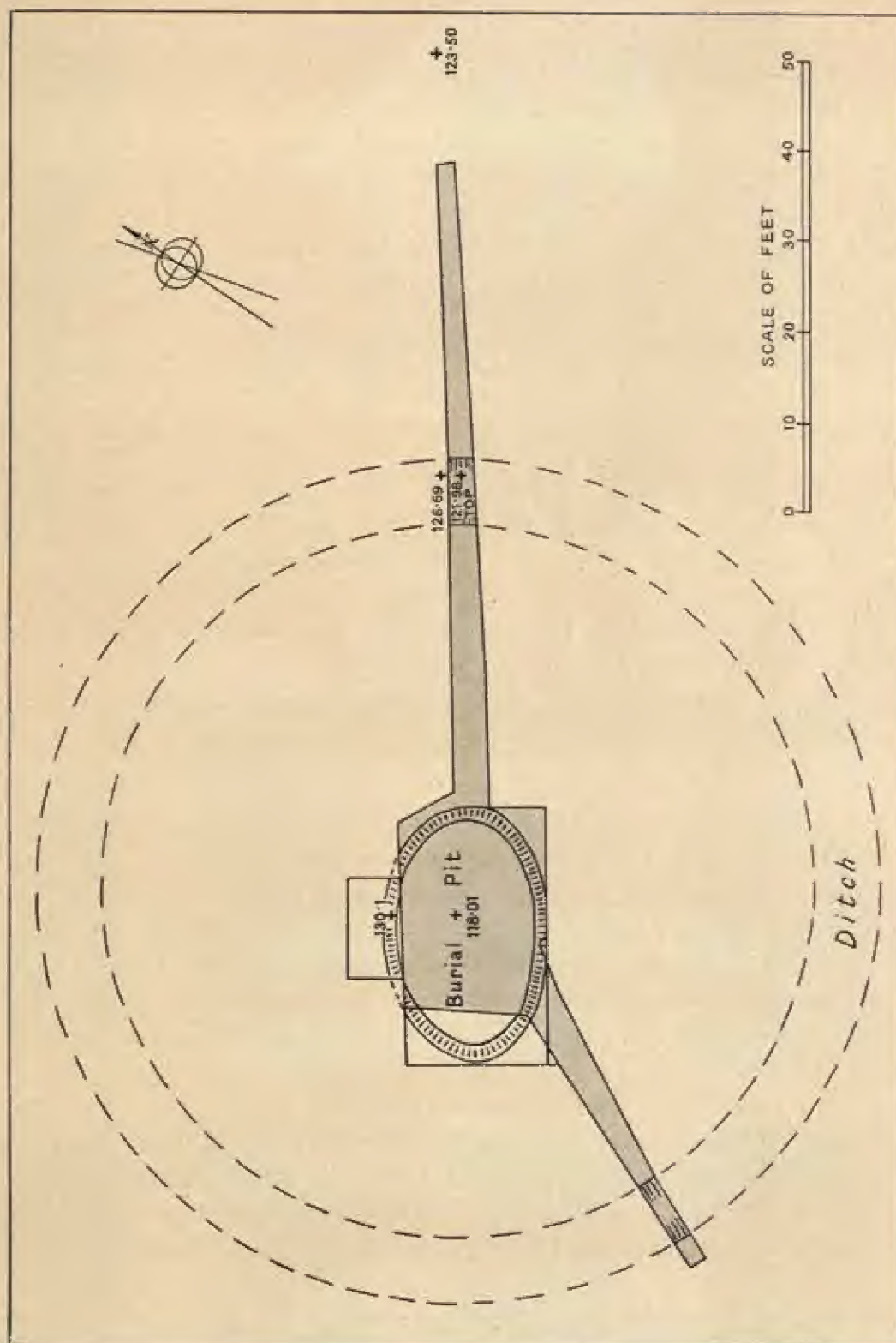


Fig. 1. General plan of the mound and ditch, showing excavated area.

line formed by decayed turf. This black line dipped down into, and covered the floor of the grave-pit, showing that after its original excavation it had been lined with turves prior to the insertion of the burial (fig. 2). The turves in the pit had been bedded upon a light coloured sandy loam from 2 in. to 3 in. deep, which had evidently been used to level the gravel floor, and line the sides of the grave.¹

I would call attention to the fact that the floor of the original grave-pit contained four smaller pits, two in the disturbed area, and two in the undisturbed area. Of the two in the disturbed area, pit E 1 was 4 ft. across its longer axis, and 1 ft. 4 in. in depth below the grave floor, filled with black earth, and a few fragments of amphorae; pit E 2 was 3 ft. across, circular, and 3 ft. 4 in. deep, and contained black earth and a great quantity of large pieces of broken amphorae.

Of the two pits in the undisturbed area, pit K 1 was small, circular, 1 ft. 4 in. across, and of the same depth, full of disturbed gravel only; pit K 2, was only 1 ft. across and 1 ft. 2 in. deep, and similarly contained disturbed gravel only.

The objects discovered in the grave may now be described under their several heads. The find-spots are shown in fig. 3.

1. *Bones.* The only actual evidence of interment consisted of a few small fragments of burnt human bones. These were found in the centre and eastern part of the grave (sites 5, 12, 16, 17, 36, 37, 38), but in total quantity would not fill more than three or four match-boxes, the largest piece being only slightly over 2 in. long.

2. *Pottery.* The pottery was all fragmentary and was found in the centre and northern part of the grave (sites 8, 12, 19, 20, 24, 30, 32, 34, 35, 37). It consisted of a large number of pieces of amphorae of the Greco-Italian type which is distinguished by a cylindrical body, deep flange, tall angular handles, and long pointed bases (pl. LI, fig. 1). This type of amphora is characteristically pre-Flavian, and occurs on early Romano-Gallic sites, such as Mont Beuvray (evacuated 5 B.C.) and also in several well known Late Celtic deposits in this country, among which I may mention the famous groups from Mount Bures,² Welwyn,³ Stanfordsbury (Beds.), Lindsall,⁴ Thaxted,⁴ Trumpington,⁴ &c.

Other pottery included a cordoned urn from site 19 (pl. LII, fig. 1) of a type found in frequent association with late pedestal-urns; for example, two or three

¹ Cf. Fox, *Arch. of the Cambridge Region*, p. 195: Barrow, Cremation burial, Roman period, lined with puddled clay at Hildersham, Cambs.

² C. R. Smith, *Collect. Antiqua*, iii, 25.

³ R. A. Smith, *Archaeol.*, lxiii, 1.

⁴ Fox, *op. cit.*, p. 100, &c.



Fig. 2. Linch-pin, site 16 ($\frac{1}{2}$)



Fig. 3. Chain-mail ($\frac{1}{2}$)

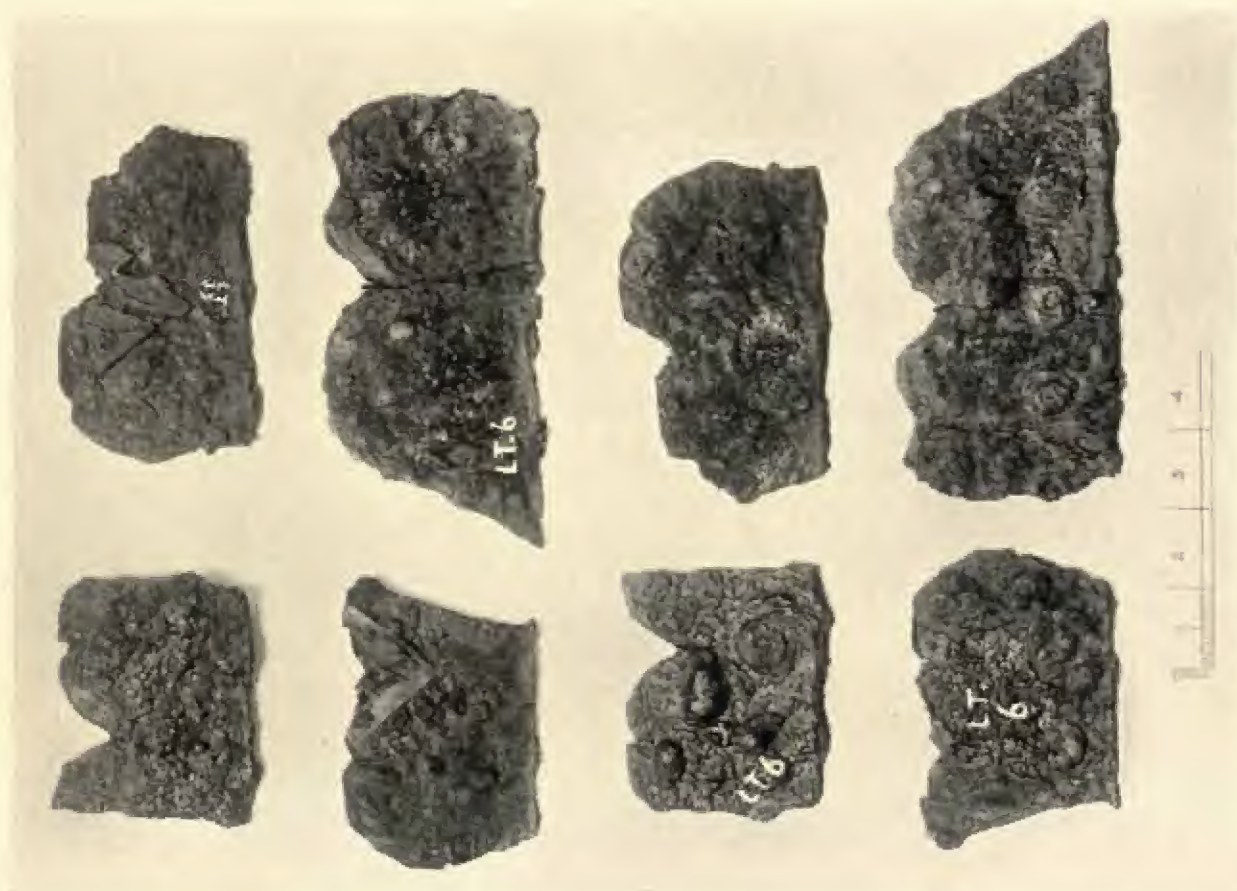


Fig. 1. Iron mounted with bronze plates and studs

Published by the Society of Antiquaries of London, 1927



Fig. 1. Chain-mail with riveted bronze hinge ($\frac{1}{2}$)



Fig. 2. Chain-mail ($\frac{1}{2}$)



Fig. 1. Chain-mail links, showing fractures (†)



Fig. 2. Chain-mail and silver studs (†)



Bronze table, site 28: top and front views

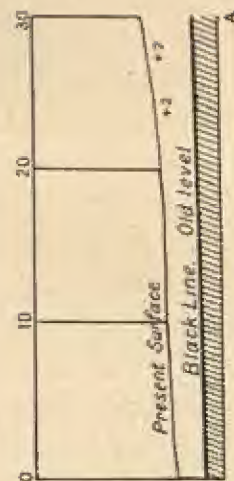
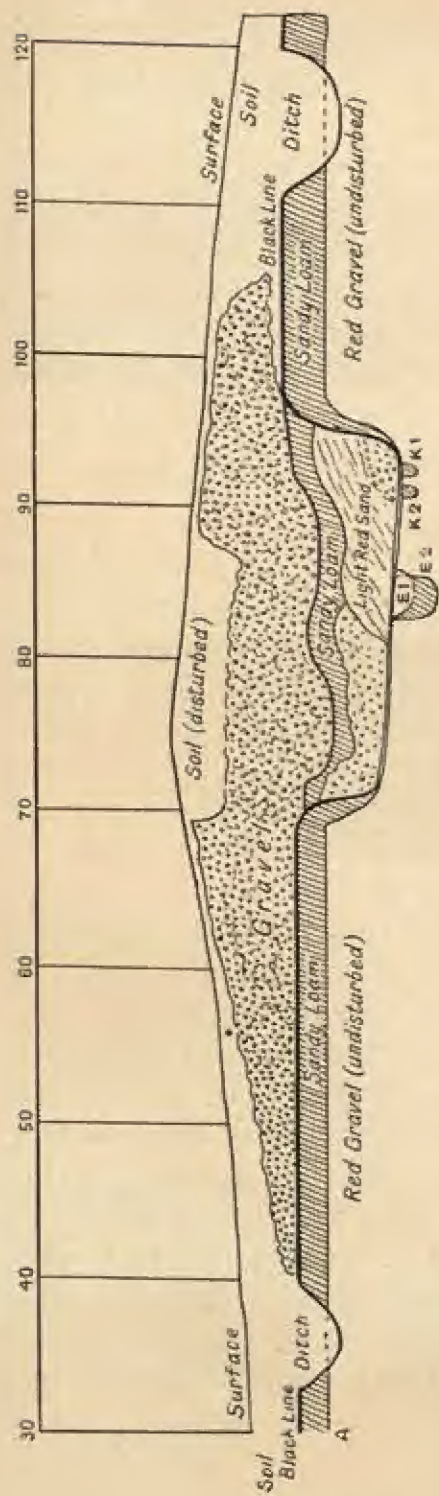


Fig. 2. Section through mound from east to west.

specimens from the Swarling urn field recently published by Mr. J. P. Bushe-Fox and ascribed by him to the late first century B.C., and the first half of the first century A.D. The lower portion of this vessel is marked with concentric girth grooves of a type found also at Swarling,¹ a feature characteristic of several urns from the Colchester area.²

Another fragment represents the base and part of the side of a butt-shaped beaker of soft brown ware, dusted with mica (pl. LII, fig. 2). This form is also found at Swarling,³ and represents a Late Celtic tradition which begins at least as early as the first century B.C., and survives into the second century A.D. The decorated zone is unusual for these beakers in that the individual roulette marks show a cord pattern. The fine micaceous fabric, the multiple grooving, and the cord pattern of the present fragment, suggest a comparatively early date in the period.

3. *Iron.* Great masses of iron in a very bad state of preservation were found, especially in the eastern section of the grave (sites 3, 6, 24, 26, 29, 31, 36). Numerous curved strips $\frac{3}{4}$ in. wide and $\frac{1}{2}$ in. thick suggested wheel tyres (pl. LII, fig. 3), similar to those recovered from Early Iron Age burials on the Somme. The radius of the curve is 1 ft. $3\frac{1}{4}$ in.; if the identification therefore is correct the wheel would be about 2 ft. 6 in. in diameter, as compared with an average of 3 ft. in other examples.

Another series consisted of strips of iron $1\frac{3}{4}$ in. wide, and apparently provided with handles (pl. LII, fig. 3), but they were neither convincing as swords nor as currency-bars. Our Fellow Mr. Reginald Smith, however, is in favour of their being swords. A large fragment of thin sheet iron, also curved (site 5), is ornamented with bronze studs along the upper edge, and is backed with wood, the wood being in turn garnished with pointed bronze plates which are covered with small indented circles. The radius of the curve of this and of a similar specimen (site 6) is too large for a bucket (20 in.), and the fragments should perhaps be identified as part of a chariot. Other fragments of sheet iron (site 6) showed an ornamental edging, and are also assigned provisionally to a chariot (pl. LIII, fig. 1). One short tapering bar of iron $5\frac{7}{8}$ in. long, which has an iron head 2 in. in diameter covered with bronze, is probably a linch pin (pl. LIII, fig. 2); similar pins have been found in Yorkshire.⁴

Scattered throughout the eastern half of the grave were found numerous

¹ *Swarling Report*, pl. ix, 22.

² *Col. Mus. Report*, 1911, 22-6, Dunmow; 1915, 3214, Maldon (Fitch Collection); 1923, 4420, Braintree.

³ *Swarling Report*, pl. ix, 34.

⁴ *Arch.*, ix, p. 279, King's Barrow, Arras.



Fig. 1. Bronze pedestal, site 21 (1/2)



Fig. 2. Base of bronze pedestal, showing wooden filling (1/2)



Fig. 3. Bronze foot, site 4 (1/2)



Fig. 4. Bronze Cupid, site 20 (1/2)



Fig. 5. Bronze handles, &c.: site 36 (1/2)

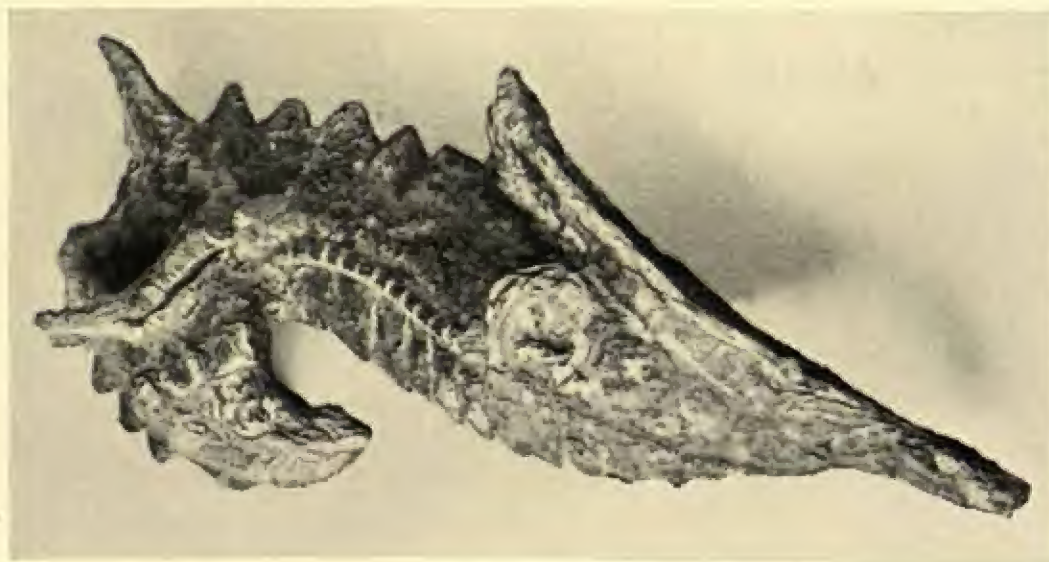


Fig. 1. Bronze griffin, site 20: side view (1/2)



Fig. 3. Bronze bull, site 20 (1/2)



Fig. 4. Bronze boar, site 20 (1/2)

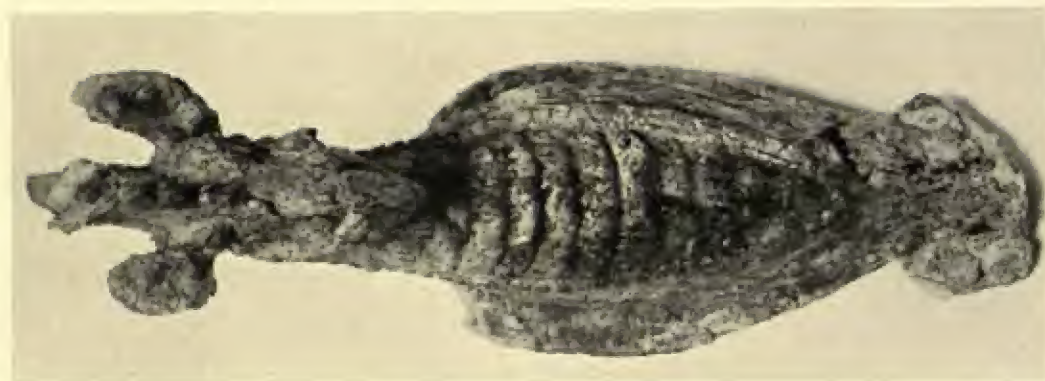


Fig. 2. Bronze griffin, top view (1/2)

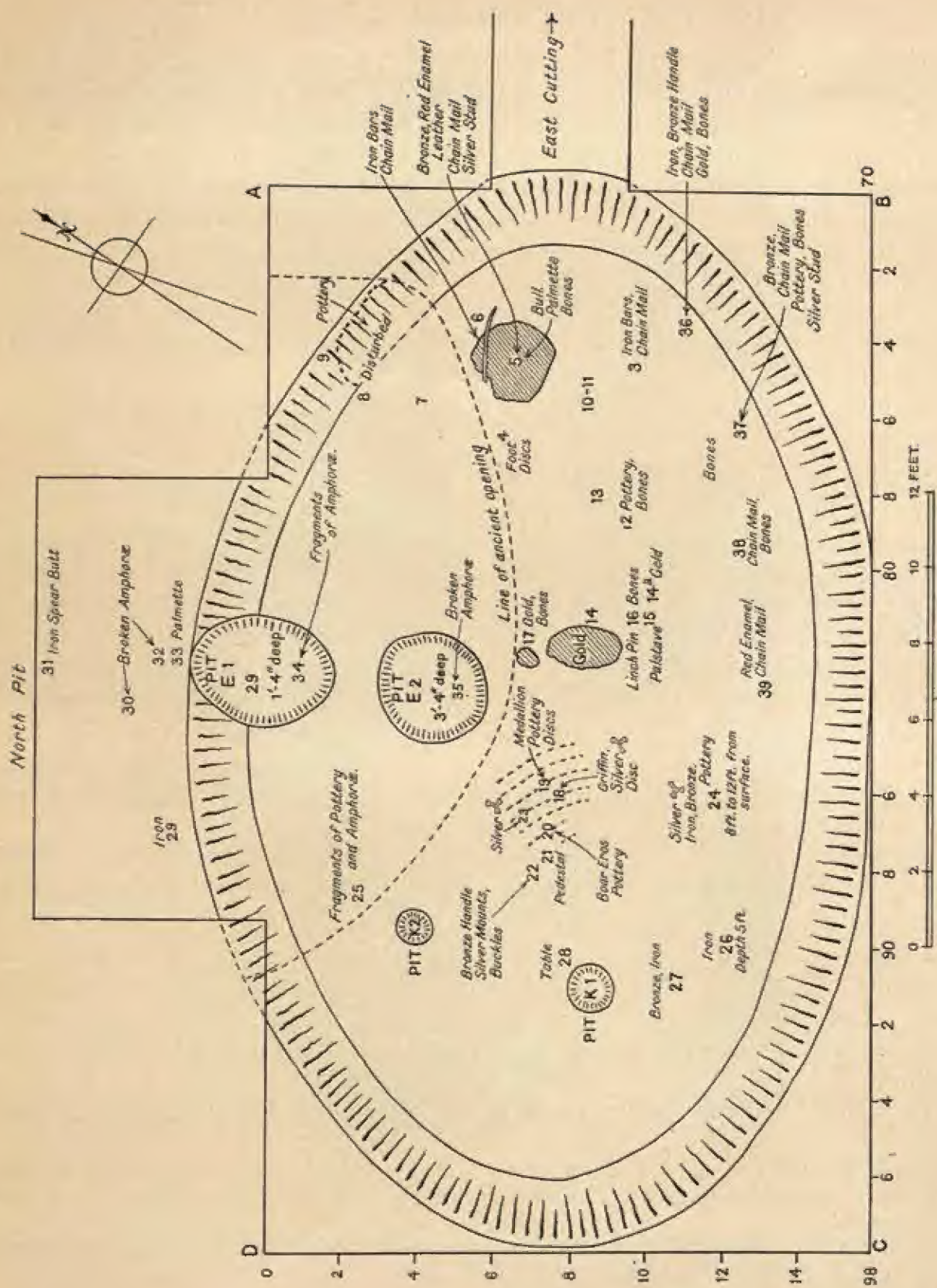


Fig. 3. Plan of the grave, showing find-spots of objects.

fragments of chain-mail¹ consisting of iron links $\frac{1}{4}$ in. in diameter, and of closely woven texture (pls. LIII, fig. 3, and LIV, fig. 2). The links are made of iron wire of fine gauge, by butting the ends, not by welding or pinning. In two instances small bronze hinges are attached (pl. LIV, fig. 1). These hinges are ornamented with three circles, and are riveted through the mail over a circular plate on the other side.² In two instances silver studs of about an inch in diameter are attached (pl. LV, fig. 2); one of these was ribbed on the surface and gilded. Much of the mail shows a clean fracture as though it had been deliberately cut in pieces before burial (pl. LV, fig. 1). In the British Museum is a Gaulish statuette of a warrior in chain-mail. The only other burial of about the same date in England having chain-mail is that at Stanwick, Yorkshire.³

A large number of very decayed iron nails of varying sizes was also found.

4. *Bronze.* Objects of bronze were numerous and important. The first object is a table $12\frac{7}{8}$ in. by $9\frac{11}{16}$ in. by $3\frac{5}{16}$ in. standing on four small ball-footed legs, and decorated on each side by pendent scroll work (pl. LVI). The upper surface of the table was framed by two incised lines placed close together near the edge, with a circle at each corner. It bears one small tenon formerly held in position by solder. The table was strengthened underneath by two bronze bars soldered on; owing, however, to the decay of the solder, these were loose, but in position, when found. This table was found upright in the western part of the grave in immediate association with some of the gold tissue to which reference will be made later. The table is of purely classical design, but not of the best craftsmanship. I know of no close analogy. Mr. Reginald Smith suggests that it is the base of a standard lamp.⁴

About three feet east of the table was found a small bronze pedestal, $3\frac{1}{8}$ in. square, 2 in. high, and hollow (pl. LVII, figs. 1, 2). It is filled by a wooden block, apparently ash, inserted underneath, and held in position by a wedge of the same wood driven through an opening $1\frac{3}{8}$ in. by $\frac{3}{8}$ in. in one of the sides. In the centre of the top of the pedestal is an iron pin for attachment to some figure. The pedestal is of classical type, but I know of no closely similar example. The marks round the base are those left by rushes on which it was standing.

In the middle of the eastern half of the grave was found a small sandalled

¹ Dr. J. Newton Friend, of the Birmingham Technical School, writes: 'The link of mail you kindly sent . . . weighed 0.038 grm. and its mean diameter was 0.6 cm. The join appears to be made by folding over.'

² For hinges and chain-mail cf. *Der Römische Limes in Österreich*, ii, 1901, pls. XIX, XX (Carnuntum).

³ Brit. Mus., *Early Iron Age Guide*, 1925, p. 142.

⁴ Mau, *Pompeii*, Kelsey trans., p. 368, fig. 194.



Embossed bronze plates, site 5 (I)

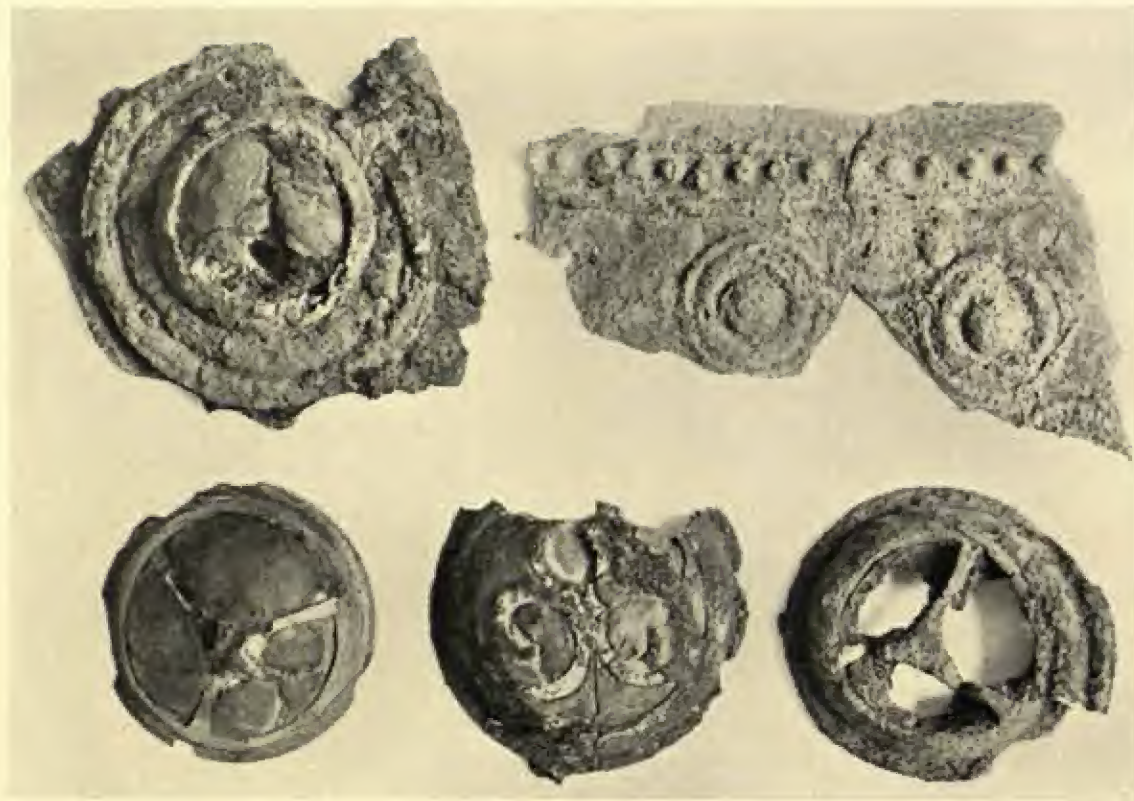


Fig. 1. Enamelled discs, site 39 ($\frac{1}{2}$)

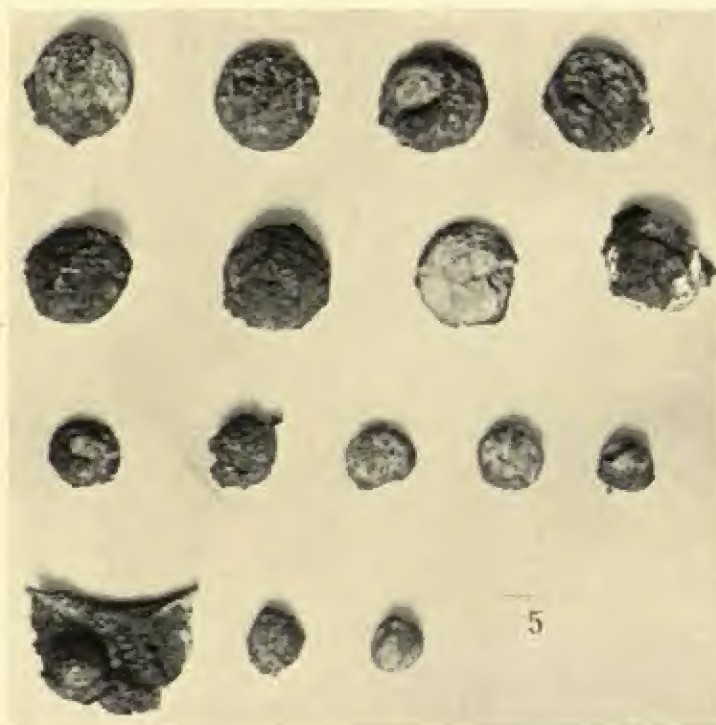


Fig. 2. Bronze studs, sites 5 and 6 ($\frac{1}{2}$)



Fig. 3. Palstave ($\frac{1}{2}$)

foot of bronze (pl. LVII, fig. 3). This has an iron pin through it, which has burst the bronze on one side. The rest of the figure has not been recovered.

A small bronze Cupid holding a bird, presumably a goose, was found close to the pedestal (pl. LVII, fig. 4). The height of the figure is $2\frac{1}{4}$ in. It will be noticed that the type is entirely classical.

Within about 18 in. of the Cupid, a neck and head of a bronze griffin were found (pl. LVIII, figs. 1, 2). This was obviously an attachment for a bowl, and should be compared with the bowl from a tumulus at Sainte-Colombe in the Côte d'Or.¹ The griffin motif came in under the semi-oriental influence associated with Ionian art of the 8th-7th century B.C. It was adopted by classical Greek art, which found a market and imitators among the Etruscans, from whom, or from their neighbours the Veneti, it spread before the end of Hallstatt II into the so-called Celtic lands north and west of the Alps. It is found at Pompeii in a form very closely similar to that of the Lexden example. No traces of the vessel to which it had belonged were recognized among the finds.

At the eastern end of the grave (site 5) was discovered a small bronze bull modelled in a lying-down position (pl. LVIII, fig. 3). It is flattened at the back for attachment. The work of this figure is good, and for the most part of purely classical type, which is further accentuated by the vitta across its back. On the other hand the craftsman has adapted himself to the Celtic tradition by placing knobs at the end of the horns. Examples of this feature in Celtic representations of bulls are well known, both before and even within the Roman period, the well-known andirons from Mount Bures and other sites being prominent examples.

A vigorous example of another well-known Celtic type is a bronze boar found just to the west of the centre of the grave (pl. LVIII, fig. 4). Unlike the bull it is in the round, but its use, whether as an attachment to a helmet, standard, or for some other purpose, is not now apparent.

Two bronze handles of normal classical type were found at the eastern end of the grave (pl. LVII, fig. 5). Two bronze palmette hinges found in the south-eastern part of the grave were probably attachments for the hinged loop-handle of a bowl. They are of rough workmanship but of classical type (pl. LXI, fig. 2).

Numerous fragments of thin bronze plate embossed with small studs and concentric circles were found in association with iron and wood in the eastern part of the grave (pl. LIX). They may possibly be the decoration of a chariot or the bronze plating of a wooden box or chest. The ornamentation shows no sign of Celtic influence, but may be compared with that found on similar sheet bronze in the Stanfordsbury burial assigned to the late La Tène III.²

¹ Déchelette, *Manuel*, ii, 526.

² Fox, *op. cit.*, p. 57.

Four bronze bosses found in the same area retain considerable remains of red enamel, the only instances of this material in the whole grave (pl. LX, fig. 1). The presence of enamel at once suggests Celtic or native craftsmanship, but save possibly in the case of the central boss in the lower row, no trace of Celtic design is apparent. Even in this instance it will be observed that the inturned ends of the three units of the design are volutes and not the conjoined trumpet ends found so frequently in so-called Late Celtic work. This modification suggests the hand of a non-Celtic craftsman, and, as in the case of the bull already described, we seem to have here an instance of a foreign craftsman trained in

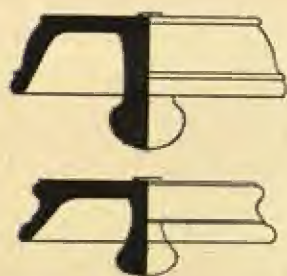


Fig. 4. Sections of bronze studs. ($\frac{1}{2}$)

the classical tradition but working for a Celtic patron and endeavouring to some extent to adapt himself to native ideas. A somewhat similar treatment is found at an earlier period in the Charioteer's Barrow at Arras.¹

Plate LX, fig. 2 shows a selection from a very large number of small bronze studs with shanks found scattered throughout the grave. The relation of these studs to iron backed with wood has already been mentioned.

In the northern part of the grave was found a collection of six large cup-shaped studs of bronze having a prominent central projection (pl. LXI, fig. 1). The sides of one series are convex with a double beading above and a single beading below, while the other series have an ogee mould divided from the lip by a groove (fig. 4). The studs resolve themselves into two groups of three specimens, one group being $1\frac{7}{8}$ in., the other $1\frac{5}{8}$ in. in diameter; they are probably phalerae from harness. Similar phalerae are shown on many Roman monuments, and are thought to have been adopted from the Celtic tribes by the Greeks and Romans at an early date.

Amongst the most interesting objects in the grave was a fragmentary palstave of normal late type (pl. LX, fig. 3). It was near the centre on site 15. It had been adapted for votive purposes; a deep incision, probably of phallic significance, had been cut on one side, and on the same side three metal studs, probably silver, had been inserted. The reverse side shows no special feature. When found, this palstave showed the impress of cloth in which it had apparently been wrapped up at the time of burial.

5. *Leather.* Remains apparently of leather clothing, in one case with a bronze buckle attached, were found at the east end of the grave (pl. LXI, fig. 3). The hide cannot be identified. The statuette mentioned above wears a leather undergarment.

6. *Horn.* Many small fragments of horn were found, but none large enough to suggest a use.

¹ *Arch.*, lx, p. 284, fig. 27.

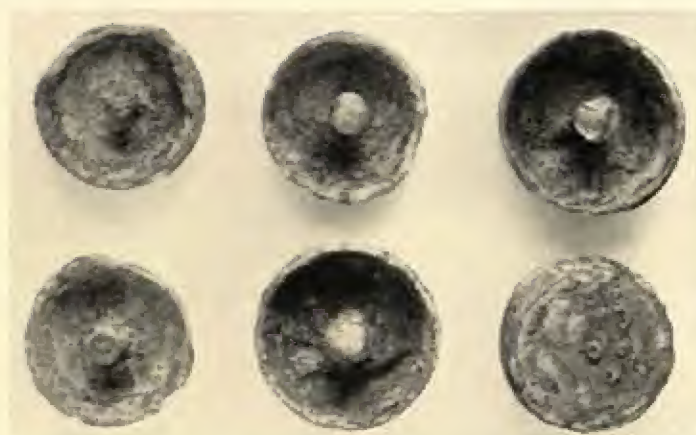


Fig. 1. Bronze cup-shaped studs ($\frac{1}{2}$)



Fig. 2. Bronze palmette hinges, site 33 ($\frac{1}{2}$)



Fig. 3. Leather fragments, site 5 ($\frac{1}{8}$)

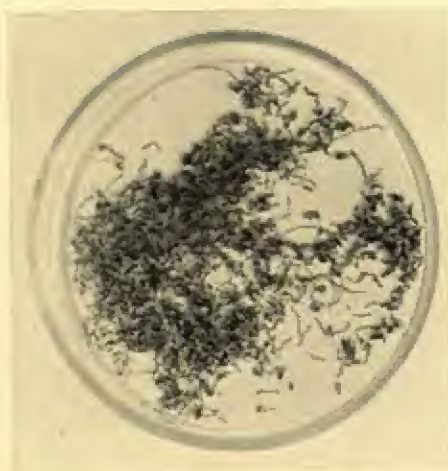


Fig. 1. Gold tissue, site 17 ($\frac{1}{3}$)



Fig. 2. Medallion of Augustus ($\frac{7}{8}$)



Fig. 3. Silver objects, site 23 (1)



Fig. 4. Iron ferrule, site 31 ($\frac{1}{2}$)

7. *Gold.* Near the centre of the grave were found traces of very fine gold tissue (pl. LXII, fig. 1). This is formed of thin sheet gold, twisted probably around some other material now decayed.

8. *Silver.* Scattered over the southern and western parts of the grave were found a large number of curious trefoil-shaped silver ornaments (pl. LXII, fig. 3), in some cases in conjunction with small rods of the same metal, but this was found to be due to oxidation. The use of these is conjectural, but it may be supposed that they were sewn on to cloth or leather. The remains of two small silver buckles were also found, site 36 (pl. LVII, fig. 5). Silver studs riveted on the chain-mail have already been mentioned (pl. LV, fig. 2).

Perhaps the most striking of all the discoveries was a silver portrait of the young Augustus identical with that on denarii issued in the year 17 B. C., as Mr. Harold Mattingly of the British Museum points out to me (pl. LXII, fig. 2). The portrait must have been cut out from an actual coin, and soldered on a small silver disc, to which is also attached a moulded frame. This ornament is in some respects comparable with the medallion portrait on the well-known sword scabbard from Mayence now in the British Museum.

I now briefly refer to the disturbed area in the northern part of the grave and one or two objects of minor interest found outside or above the actual pit.

The disturbed area contained a large number of fragments of pottery, apparently all amphorae, and a few fragments of iron including a ferrule of square section (pl. LXII, fig. 4). This was just outside the area of the grave. A second tapering square ferrule was found on site 24 in the centre of the grave. A similar ferrule was found at La Tène, and is described as being rare.¹ The date of the disturbance in this area is quite unknown. Incidentally, I may record the finding of one melon bead, two stone mullers, and a number of oval pebbles which may have been used as sling stones. All these were above the actual gravel level.

In conclusion, I would like to draw attention to the following points:

1. The portrait of Augustus shows that the burial was subsequent to the year 17 B. C.

2. The pottery is all consistent with a date at the end of the first century B. C. and well within the first century A. D.

3. The wealth of grave furniture shows that the burial was that of a personage of considerable importance, and this impression is accentuated by the presence of the mounted silver portrait of the emperor.

4. The prevailing character of the metal-work is classical, not Celtic. Some of

¹ Vouga, *La Tène*, 1923, p. 56.

the work, notably the griffin, was probably in actual fact of Mediterranean origin, but objects such as the bull and the enamelled bosses would seem to be the work of classical craftsmen deliberately adapting themselves to a non-classical tradition. All this is closely analogous to the long recognized employment of Roman craftsmen by the Cunobelin dynasty in connexion with the production of their coinage during the first forty years of the first century A. D. I therefore infer that the burial is that of a Romanized Celtic noble or chieftain who died some time during the Cunobelin régime at Colchester.

Two final points may be noted in this connexion—in the first place the whole area immediately surrounding the tumulus has proved remarkably rich in Late Celtic pottery of the late pedestal-urn series, though free from burials of the Roman period. All these Late Celtic burials have hitherto been undistinguished by the presence of a mound, and it would seem that in the present burial we have a rare example of the convergence of two different Celtic or native cultures, namely, the pedestal-urn culture which did not make use of sepulchral mounds, and the burial-mound culture which is well known in the neighbourhood of Bavai and Tongres in Belgium, and is represented sparsely in burials dating from the first and second centuries A. D. in the counties of Kent, Essex, and Herts.

The last point to which I would again draw attention is the evidence throughout the grave of a deliberate mutilation of the goods prior to their deposition in the burial. Evidence of mutilation of the kind has been observed in connexion with funerary or votive deposits of several prehistoric and early historic cultures from the Neolithic period downwards, and in particular reference may be made to the prevalence of the custom in Scandinavian countries during the early centuries of the present era.

In conclusion, I must express my very great indebtedness to our Fellow Dr. R. E. M. Wheeler for generous help and assistance throughout the whole undertaking and in the preparation of this paper; also to our Fellow Mr. H. B. Walters of the British Museum, to Mr. A. G. Wright for much help with the pottery, and to Mr. M. R. Hull for the diagram of the phalerae (fig. 4).

DISCUSSION

DR. WHEELER, in congratulating the author, described the paper as one of the most important in recent years. The mound-burial seemed to be the earliest of a long series dating from the first century in south-east England as well as in France and Belgium, and the latest might be the Bartlow Hills, which contained a coin of Hadrian. The date of the Lexden

example could be fixed within narrow limits, as the head of Augustus was from a denarius of 17 B. C. and being in mint condition could have been mounted soon after that date, and probably buried in a generation contemporary with Tasciovanus and Cunobelin. The paper should incite some student to investigate the whole series of mound-burials, and the task was rendered easier by a paper on the foreign examples in the *Annales de la Société archéologique de Namur* of 1900. Across the Channel their distribution was between Bavai on the west and Maastricht and Tongres on the east, on both sides of the east-and-west Roman road, and generally on the upper Meuse and Somme. Their occurrence in only a few counties of Britain indicated an immigration; and the present was the first instance of the convergence of this culture with that of the pedestal-urn burials. The work had been carried out with extreme care, and a welcome addition to the paper would be the subsequent publication of a map of similar finds on both sides of the Channel.

MR. REGINALD SMITH commented on the disorder in the tomb, which made the interpretation of the finds more difficult than usual; but the excavators had recovered much of interest. Cremation would have been the funeral rite at the period in question, at least in Essex; and the early type of amphora, which was well represented at Welwyn, might be regarded as a pottery barrel, easy to transport by hand and well fitted to be rolled and stored on board ship. Pottery lamps were common in Roman burials, but one of bronze might have been used in such an important interment, and the bronze tray resembled the base of Italian standard lamps (Ceci, *Museo Borbonico*, pl. III). He recognized portions of iron chariot-tyres like those from Somme Bionne in the British Museum, and thought some of the other iron fragments might have belonged to a chariot, as the linch-pin clearly did. The wood-fragments with studs attached by rust to iron seemed to be part of a sword or dagger in its sheath; and the square pedestal might be compared with two in the hoard from Felmingham Hall, Norfolk, discovered in 1844 and recently added to the national collection. It should be noticed that the enamel was all red, not of other colours as in the Roman period: it was considered an imitation of coral, and the domes so ornamented might be compared with one from Hod Hill of the same period. He confirmed the opinion that the egg-shaped pebbles were slingstones, as a series had been found below the turf inside a rampart of Yellowtop Camp above Paviland Cave in Gower, evidently an ammunition store for the defenders of the camp.¹ There seemed to be the handle and broken blade of a sword that corresponded to the Roman rather than the British pattern; and it was pure misfortune that no coins of Cunobelin were found to fix the date with certainty.

MR. BUSHE-FOX said the value of the discovery was increased by Dr. Laver's clear exposition, which was intelligible to everybody present. In his opinion it was the most important British burial in the country, and it should be viewed in the light of local history. Early in the last century B. C. the Belgae invaded the country, and Caesar found sections of them in possession both north and south of the lower Thames. Cassivellaunus and his neighbours ceased quarrelling to join in repulsing Caesar, but eventually Tasciovanus ruled over most of the country immediately north of the Thames. Commius and his three sons ruled in the south, but that line was deposed by Cunobelin, who became master of south-east Britain. Strabo in the reign of Augustus spoke of a considerable British trade with the continent, and there were evidently many Roman merchants in the country before the Claudian conquest. Strabo's testimony was illustrated and confirmed by the present discovery, and the burial might have been at any time after 17 B. C., but probably in Cunobelin's reign. The bowl-handle and figure of Cupid were clearly Roman, and he had seen a similar bronze table at Naples. If the interred belonged to a ruling house as suggested, the site was too far east for any of the Catuvellauni.

THE PRESIDENT expressed the Society's appreciation of the paper and excavation. The

¹ Another instance is given in *V. C. H. Beds.*, i, 160.

tumulus had been scheduled by the Ancient Monuments Board, but its demolition in view of a building scheme had been permitted on condition that it was thoroughly examined and described, and that policy had been more than justified. The work had been carried out with the utmost skill and discretion, and the objects recovered only emphasized the desirability of recording similar interments on both sides of the Channel. The medallion of Augustus was a humble relic, not of advanced craftsmanship, and did not in itself date the interment, as it might have been handed down through generations.

XI.—*Excavations at Merton Priory.* By Lt.-Col. H. F. BIDDER, *D.S.O., M.A., F.S.A.*, and the late Rev. H. F. WESTLAKE, *M.V.O., M.A., F.S.A.*

Read 10th December 1925

THE earlier history of the Canons Regular of St. Augustine, or Black Canons as they were commonly called, can hardly now be traced. They do not seem to have made their appearance in England until after the beginning of the twelfth century. It is true of course that certain houses, such as Huntingdon and Taunton, which subsequently followed the Augustinian Rule, were founded at a far earlier date, but the whole matter needs a discussion into which we cannot here enter. Like the Benedictines, each house was a separate corporation bound in no way to other houses. Each canon was sworn to 'stabilitas' or permanence in the house of his profession. Like the Benedictines, too, the Canons Regular held their triennial Chapters in accordance with the Lateran Council of the year 1215. Unlike them, however, the Austin Canons might serve the cures of souls, in particular those attached to their own houses. This last is an interesting point as bearing upon the fact that Thomas Becket, who as a child of ten began his education at Merton, at a later date wore the habit of the Merton Canons, while Hubert Walter, bishop of Salisbury, soon after his enthronement as archbishop of Canterbury became a professed Canon of Merton. The first house to be settled in England would appear to be that of St. Botolph, Colchester, which was established within a year or two of the beginning of the twelfth century. The foundation of Merton must have followed shortly afterwards. Stowe, indeed, would have it in 1092, but this date cannot be sustained. Matthew Paris tells us that it was in the year 1117 that Robert the prior, with a few brethren, first occupied Merton and began there to keep inviolably the rule of St. Augustine. The Annals of Waverley give the same date, but the entry there is a marginal note written in a different hand to the body of the manuscript. A late fourteenth-century manuscript at the College of Arms gives so detailed an account of the foundation that it may be a transcript of the earlier testimonies of eye-witnesses. The matter, however, is of little moment, as it affects the date 1117 by only two or three years. The history of Merton may be allowed, somewhat doubtfully, to begin with the grant by Henry I of his vill of Merton to Gilbert the Norman, who brought thither Robert, the sub-prior of Huntingdon, with a few brethren, to be the first prior, and in turn built two wooden churches for

their use. Our sometime Fellow Major Heales printed a long précis of the manuscript mentioned above in his Records of Merton Priory, where the story concerning the early history may be read.¹ Our present purpose is only to relate so much of it as will serve as an introduction to the story which we have to tell of the fabric. More certainly that story may be said to begin with the Charter of Royal foundation granted by Henry I, in the year 1121-2. In this charter the vill of Merton was granted directly to the Canons Regular, serving or hereafter to serve God in that place, for the building of a church there in honour of the Blessed Virgin Mary, and for the weal of the souls of the king and queen, and others. In this charter the rights of the see of Winchester are expressly reserved, and it is therefore a little unfortunate that the style Merton Abbey (which first appears in 1521) instead of Merton Priory should, by a careless use, be perpetuated to this day, at least as the name of a railway station built on part of its site (fig. 1).

Some few years after the date of this Charter, perhaps in the year 1130, as related in the document quoted above, the beginning of a new church of stone was made. If it is to be relied on, a statement in *Decem Scriptores*, that after his death at Mortlake at the end of the year 1135, Henry I's body was brought to the new church of the Canons of Merton, would point to the conclusion that this stone church was now well advanced. Of the character of this church nothing has hitherto been known, but we hope to shed some little light upon it in the course of this paper. It is to be noted that the charter of Henry II, 1156-7, confirming the vill of Merton to the Canons does not refer to a church *hereafter* to be built. This is but a scrap of negative evidence as to the completion of the church, but throughout we have had to rely on scraps. We are on more certain ground when we find that the altar of the Holy Cross was dedicated by the bishop of Bangor on 31 October, 1196. This would seem to point to a church now in full use both by the Canons Regular and the laity.

The next event in the history of this earlier church is recorded in the Annals of Dunstable. In December 1222 a great storm occurred, which blew down the two towers at the front of Dunstable church and the tower of Merton, as well as destroying many other buildings and killing many people. The fall of the tower must have caused considerable damage to the rest of the fabric. The grant by Henry III to the prior of six ancient oaks from Windsor Forest in 1225, *ad operacionem Ecclesie sue*, and a further grant of ten more in 1227 from the forest of Galtres, *ad fabricam Ecclesie sue*, seem to point to some-

¹ Our Fellow Bishop Browne, in a lecture delivered at Merton in connexion with the 800th Anniversary celebrations at the parish church, interpreted this document (which he examined) to mean that Gilbert first built the parish church and established Robert and his Canons there in 1115, and that he moved the priory to the site by the Wandle in 1117.

thing more extensive than the rebuilding of a tower, but it remains to say that a considerable search has failed to throw the smallest documentary light on the

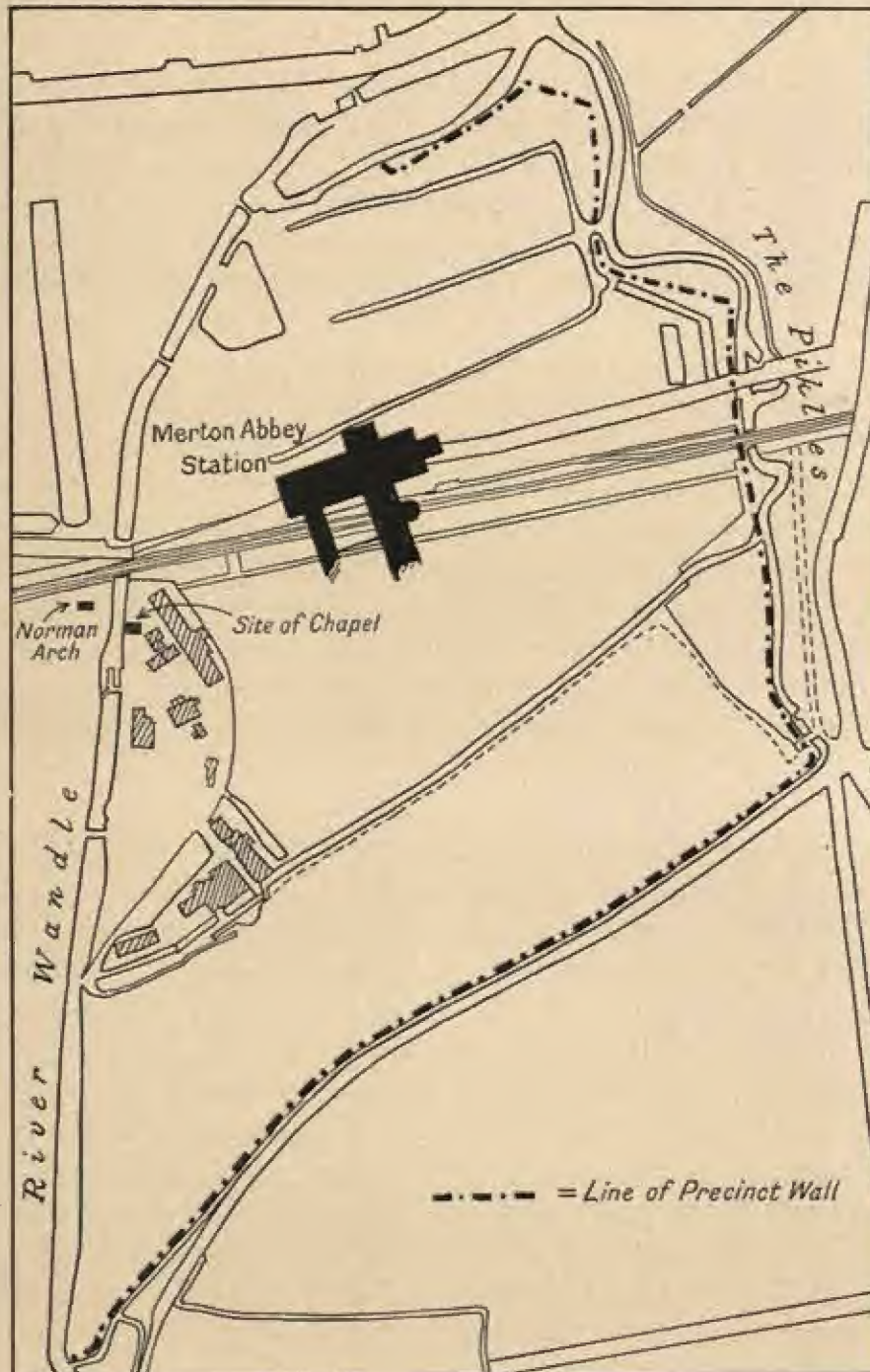


Fig. 1. Merton Priory: site plan.

extension and rearrangement which must have taken place in the thirteenth century. Lambarde, in his *Topographical Dictionary* (p. 212), makes the

statement under the year 1262, without quoting his authority, that the new chapel of St. Mary was built in the reign of Henry III. If we may accept this it may be fairly said to mark the completion of the enlarged stone church, a period with which our observation of the foundations has led us instinctively to agree. Moreover we find, under the 14th of January 1263, one William Vadlet taking sanctuary in the priory church, and at the same time Henry de Micheham doing the same in the chapel of its infirmary.

The interest taken by Henry III in the priory is instanced by his relatively frequent visits to it, while it is hardly necessary to recall the fact that the laws (*quasdam novas leges*) which pass under the name of the statutes of Merton were issued in 1236. They were the work of the Grand Council of the realm which met no doubt in the chapter-house, the position of which we have been able to determine. Moreover, it was at the cross-roads outside the gate of Merton towards Carshalton that Henry ordered to be set up a fair strong cross in memory of William, Earl of Warenne and Surrey, who died in 1240. We may recall at this point, that it was at Merton that Hubert de Burgh took sanctuary *ante majus altare* in 1232 from the angry citizens of London; and that hither fled William of Wykeham in December, 1376, when forbidden to come within twenty miles of the king's court.

In 1393 the prior pleads to the bishop that the chapel of the Blessed Mary in the church at Merton needs repair estimated at 240 marks, while necessary reparation to the nave would cost 2,000 marks. The total yearly income was but 1,345 marks. This is the last important notice of the fabric until after the surrender of the priory, which is dated the 16th of April, 1538, and signed by the prior, subprior, and twelve other canons. Almost immediately after the surrender of the priory, one John Whytechers of Merton was paid 13*s.* 4*d.* for 'uncovering the body of the church of Merton Abbey'. Within four months 3,050 tons (loads) of stone had been carted away for the building of the new palace of Nonsuch at Ewell at a contract price for the cartage of 8*d.* a load—i. e. 2*d.* a mile. Probably nothing but faced stone would be taken, and this quantity would be provided only by the destruction of the whole church.¹

Between the surrender of the priory and the beginning of the present exploration in 1921, the priory buildings had practically disappeared alike from sight and from the memory of man. No sign whatever remained of the great range of church and cloister, refectory and dormitory, cellarium, chapter-house or prior's lodging. The only mark to distinguish the site as holy ground was the precinct wall enclosing an area of some 50 acres, of which wall a large portion (considerably rebuilt) still remains, and is happily protected by the National Trust (fig. 1). It was in the collapse of a portion of this wall in 1797 that

¹ *L. and P. Foreign and Domestic, Hen. VIII*, vol. 13, pt. ii, pp. 130-4.

a charming little head with its sometime gilded fillet was found. The finder was a calico manufacturer, a Mr. Halfhide, who notes as follows: 'It had a gold coronet on the head, the eyes and colour perfect when found, but defaced by washing'. It was presented to the Society by their Fellow Sir William Hamilton, who explained that the statement as to the gold coronet meant no more than that 'the painting representing the gold and gems on the coronet was much fresher on its first discovery than in its present state'. In 1923 another sculptured head was found on the demolition of a piece of the same wall. This is a grotesque corbel of the thirteenth century, in a very perfect state of preservation.

That the king's leavings should be used as a quarry, in a stoneless district so close to London, was to be expected; and in 1559 we find the churchwardens of St. Mary at Battersea paying 14s. for three loads of stones from 'Marten', and 6d. to 'John Tylar' for 'digging up the stones we bought'—surely an indication that nothing but foundations were then available. At any rate, by our own day the priory was 'sunk without trace'. It has been said that no sign was left upon the ground itself. A fairly exhaustive search has revealed no documentary description or indication of the character of the buildings. No local tradition survived. One small engraving of the east end of a 'chapel' standing near the river bank and still in occasional use during the eighteenth century was the only record of what had been one of the great priories of England (fig. 2).

Towards the end of the last century the railway came. The station buildings were erected across the site of the south transept of the church, the line and platform crossed the position of the chapter-house. No doubt foundations were met with in the course of the work, but no attention was paid to them, as far as is known.

Then, in 1891, the Lambeth Water Company drove a trench along the station road which just hit the buttresses of the Lady chapel and the columns of the extended quire. Of this a careful record was made by the late Mr. Quartermain, an architect living in the neighbourhood, whose material has been kindly placed at our disposal by his widow. There was not enough, however, in the information obtained in this one trench to indicate what part of the priory buildings had been met with.

Early in June 1914 an old house, known as Abbey House, was pulled down. Built up in the front of it was found a beautiful late-Norman arch, the nature of which is best seen in the photographs with which our Fellow Mr. G. C. Druce has kindly supplied us (figs. 3 and 4).¹ Another of our Fellows, Mr. P. M.

¹ This arch is preserved *in situ* on the recreation ground of Messrs. Liberty & Co. An Early English capital (fig. 10) was also found during the demolition.

Johnston, gave an admirable description of this arch and its probable place in the scheme of things to the Surrey Archaeological Society (*Surrey Arch. Coll.*, xxvii, 136). He suggested that in the absence of proof to the contrary it formed part of the Hospitium. We should regard this suggestion as well-founded. It may be mentioned that parallel to this but now separated from it by the



Fig. 2. East end of 'chapel': from Manning and Bray's *History of Surrey*.

railway is what Mr. Johnston has called a Norman-Jacobean gateway, which would lead directly to the arch under review. It is fairly certain that the Norman stones in this construction are gleanings from the priory ruins, used in the making of a garden entrance.

In 1919 another trench was driven down the road, this time by a Gas Company. It was not so deep as the last one, but it struck two graves walled with stone, the position of which was recorded.

In the same year the land adjoining the station road was bought as

a factory site by Messrs. Corfield, Ltd. We should like to say at once that it was a member of that firm, Mr. John Corfield, who first called our attention to the possibilities of the site, and invited us to begin explorations; and that, throughout our work, the firm has given us every facility for carrying on our investigation on the half of the priory church that lies beneath the surface of their ground.

The factory erected by Messrs. Corfield was fortunately altogether clear of what proved afterwards to be the church site, the only obstruction being a shed, beneath the floor of which we were allowed to probe; but during the erection of



Fig. 3. Norman arch found in 1914.



Fig. 4. Detail of moulding of Norman arch.

the factory two discoveries were made in the adjoining ground: first, an interment, the bones being uncoffined and accompanied by a fourteenth-century spur; and secondly, the presence of a large number of masons' chips in a certain small area, together with some spoilt stones. These facts led us to assume that the stone coffins found by the Gas Company were inside the church, and the 'knight' with his spur outside the church, and further, that the chips indicated the mason's lodge, which would probably be at the angle of the quire and transept, remote from the cloister. The chips proved to be in the angle between the Lady chapel and the east wall of the quire aisle.

The uncovering of a block of concrete in the autumn of 1921 encouraged us to begin actual excavations. From that first block has gradually grown the plan of a church over 300 ft. long, showing the original Norman church, the medieval extension, the chapter-house, the cloister, and some indication at any rate of the conventual buildings. This result could never have been achieved but for the cordial co-operation, not only of Messrs. Corfield but of the Metropolitan Water Board, when they drove yet another trench along the road, and of the Southern Railway Company, whose station and line cover an important part of the site. The Water Board trench, as we had anticipated,

struck the south wall of the Lady chapel and the columns of the nave extension. It also laid bare considerable sections of the pavement of the church. Throughout the work we were given every assistance in photographing and noting what was found. Sections of the foundations were left undisturbed until they could be photographed complete. Pieces of pavement were specially uncovered for us. The greatest care was taken by the staff that nothing should be passed unnoticed, and that all that could be removed should be carefully preserved.

In this trench two interments of special note were found, both situated beneath the floor of the sanctuary of the church. The first had a rude coffin-shaped series of stones, faced on the inside, surrounding the bones, while the second was of similar character but of more careful workmanship. They were at 5 ft. and 2 ft. below floor level respectively. In neither case was there a lid or base, nor a head rest, the stones forming merely a lateral surround to the body. It was thought well to send the stones of the second to the London Museum, where they may now be seen, as representing an interesting and somewhat uncommon form of interment. The two interments found previously by the Gas Company were of similar character and also in the sanctuary. Two more were subsequently found there—one just in front of the north end of the reredos, and one a little further west.

The Southern Railway have by their generous assistance made the investigation of their portion of the site possible. They arranged for the digging of the holes between the sleepers of the running lines, which laid bare the foundations of the Norman chapter-house. They similarly exposed portions of the cloister, dormitory, and refectory walls beneath their coal-sidings, and they have allowed and assisted the investigation of the foundations of the nave of the church that lie beneath the station approach. Further, they have marked the principal features of the plan upon the actual site by dwarf walls and other methods so that all may see, and they propose to put up a framed plan and other objects connected with the priory inside their station.

Before describing the plan of the priory in detail, it will be well to give a general account of the types of foundation met with. These fall into two main categories:

- (1) A broad raft or sleeper of loose gravel mixed with a little lime, at a depth below the floor level of the church of from 2 ft. to 4 ft.
- (2) A wall-like foundation of very hard flint concrete, the surface at or slightly above floor level.

The Norman east end is marked only by foundations of the first type. The nave colonnade also rested on this type of foundation throughout. The walls of the nave and transept are marked by foundations of the second type,

as are those of the chapter-house and monastic buildings; while the thirteenth-century eastward extension had the same type of foundation in a harder and heavier form.

It may be that, in the earlier Norman work, the stone of wall and pillar was carried below the surface of the ground down to the sleeper bed; whereas in the latest Norman and succeeding buildings the foundation was raised with flint concrete to ground level, where the stonework began.¹

If the nave was finished in late Norman times, the latter principle may have been adopted for walls, while columns were still carried down to a sleeper foundation as formerly. This suggestion would account for the very remarkable fact that absolutely no trace of the position of the columns has yet been found upon the sleeper foundation of the main colonnade of nave and choir. All stonework being of value, the columns were demolished down to the sleeper bed. But the separate bases of hard flint concrete for the four columns added to the quire in the thirteenth century stand clear to-day, at floor level.

Although the stones of the church building, and even the flint foundations, have been of sufficient value to tempt builder and road-maker to dig them up and take them away, this does not seem to have been the case with the stone paving of the church, areas of which remain *in situ*. This may be because the paving usually consisted of thin flags of green sandstone which is very friable, and dissolves under the weather into its component sand. The church itself was largely built of this material, and must have been subject to external decay, as it will be remembered was pleaded by the prior in 1393. Flooring tiles are sometimes found in conjunction with the stone flags, with occasional fragments of decorated tile (figs. 7, 8, and 9).

The plan of the church falls into two main periods. We have first a Norman church, probably completed in the twelfth century. This church had a square east end, and transepts with chapels against their east walls, much on the plan of Kirkstall, Rievaulx, and other Cistercian churches (for at that time there was little distinction between the Augustinian and the Cistercian plan). The long aisled nave and the chapter-house with its apsidal end belong to the later part of this period. Then (following perhaps the fall of the central tower) we have a period of extension in the thirteenth century. The north transept was probably rebuilt: the east wall of the sanctuary was removed, and two bays were added to the quire. Aisles were built to the enlarged quire, forming an ambulatory leading to the new Lady chapel at the east end of the church (fig. 5).

¹ Of course it does not necessarily follow that where the first type only exists now the second never existed. There has been a great deal of grubbing up done during the last three centuries; but on the whole the indications are that the foundations of the earliest work were of the first type only.

I. THE NORMAN CHURCH AND BUILDINGS

The earliest completed church appears to have consisted of a rectangular aisleless chancel, transepts, and an aisled nave. The chancel was 35 ft. or two bays in length and 35 ft. between wall centres—a distance that is retained throughout the church for the sleeper foundations of the colonnades. Half this distance is assumed to be the length of a bay—an assumption that works out well on the whole. This would give eight bays to the completed nave. The north transept comes square against the chancel wall. The foundation of the wall of the north aisle of the nave is complete up to floor level for over 100 ft. from the west end eastwards; it is of flint concrete 4 ft. broad, and shows no trace whatever of buttresses. The presence of a band of the loose deep foundation running north and south at the second bay west of the crossing may indicate some feature of the early church.

At the west end, foundations of a similar character, though somewhat disturbed, indicate a western porch projecting 10 ft. from the face of the west wall, with an inner span of 23 ft., the opening expanding, at the outermost of three main orders, to nearly 40 ft. These porch foundations are only found on the north side. On the south (which is under the road) they have disappeared.

Search was made, with the assistance of the Southern Railway, for the foundation of the south wall of the nave. Most of this appears to have been grubbed up (it is reported to have been represented by a ditch a few years ago), but a fragment was found which gave the line and confirmed the total breadth of the church—61 ft.

The conventual buildings, which may probably be also referred to the Norman period, have been located as far south as the north wall of the refectory, by means of trial holes dug with the assistance of the railway company at such spots as were possible—between the sleepers of the running lines and sidings, and alongside the tracks. It was impossible to explore further south, as the ground is covered by the railway coal yard, which has recently been made good with a foot or so of flints and chalk well rolled in. Enough has been found, however, to indicate with certainty the dimensions of the cloister and surrounding ranges, and of the chapter-house. In all cases the foundation was of hard flint concrete. The result is best shown by reference to the plan (fig 5).

There is a striking analogy to the Norman cloister and chapter-house of St. Augustine's Abbey, Bristol, another Augustinian house, as its name shows. This is all the more interesting, inasmuch as the thirteenth-century extension of the east end of the church is almost identical with the similar extension at Bristol, as will be seen.

To deal first with the chapter-house—this was a building 70 ft. by 30 ft.

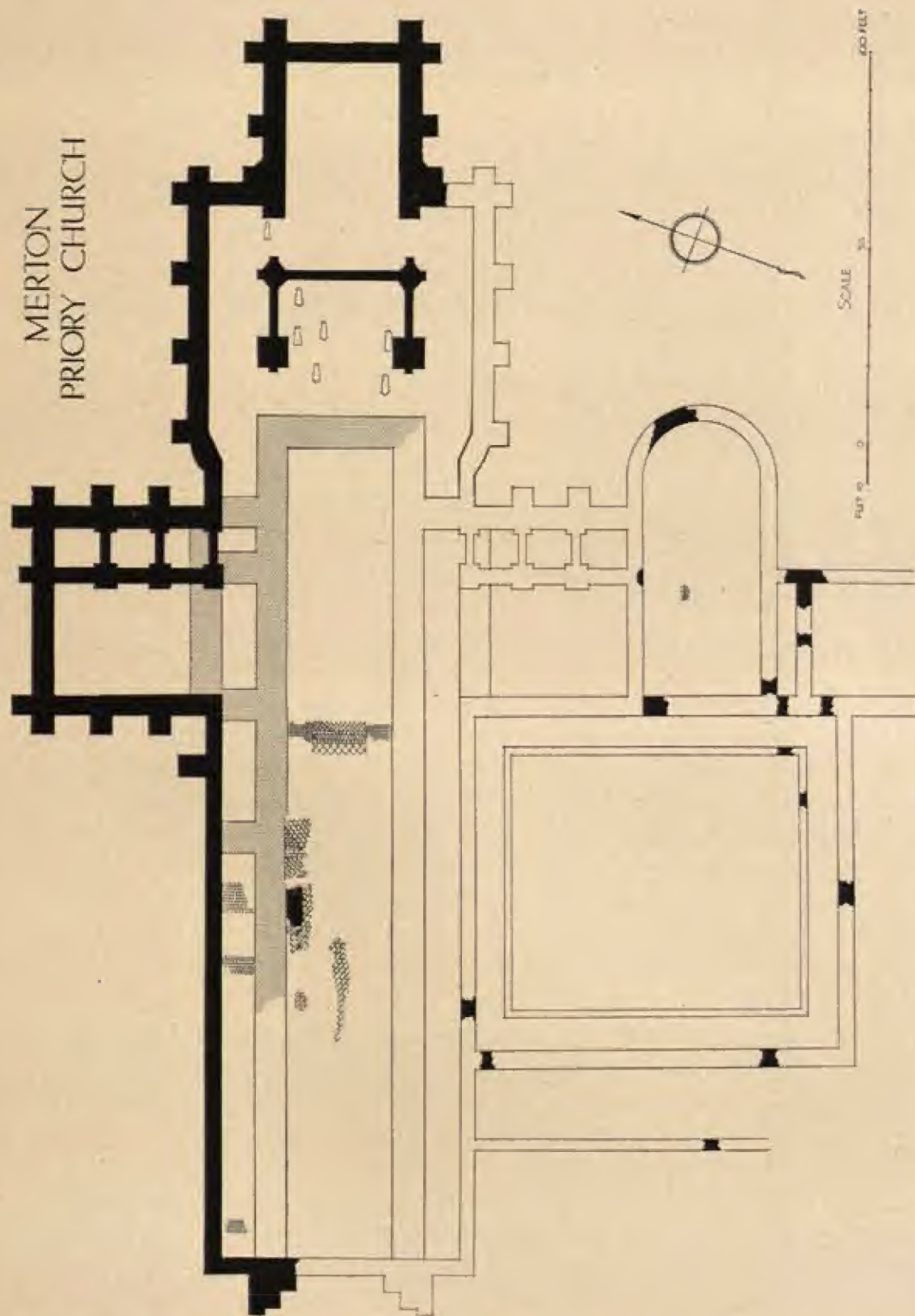


Fig. 5. Merton Priory church : ground plan. Foundations proved by excavation : floor level, black ; below floor level, stipple. Conjectural walls in outline.

(interior measurement) with an apsidal east end. Although the south transept of the church cannot be investigated, being under the platform and booking office of the railway station, the position of the north wall of the chapter-house, equidistant from the centre of the church with the north wall of the north transept, raises a strong presumption that the chapter-house was, at any rate after the enlargement of the church, against the south transept wall. The plan and proportions of the chapter-house are almost identical with those of Bristol. A small fragment of curb-stone and tiling found under the railway line indicates the central walk or aisle, 10 ft. broad.

A slype was found on the south side of the chapter-house, and the interior breadth of the dormitory was determined—30 ft. The cloister proved to be rectangular, 93 ft. by 85 ft., with a cloister walk 8 ft. broad. The internal breadth of the cellarer's range was 20 ft.

2. THIRTEENTH-CENTURY WORK

(a) The North Transept.

(b) The extension of the quire and construction of the Lady Chapel at the East end.

(a) *The North Transept.*

The existing foundations of the North Transept are those of a thirteenth-century rebuilding, probably upon the Norman plan. There were originally four small chapels, each 12 ft. square internally, against the eastern wall, the innermost being removed at a later date to make an entrance to the aisle of the extended quire. Buttresses indicate a vaulted roof. The buttress next to the north corner of the east wall does not correspond exactly with the first chapel division, since the buttresses are spaced from the centre of the north wall, and the chapels are not.

(b) *The Quire Extension.*

The quire extension, with the construction of the Lady chapel behind the high altar and quire aisles leading thereto, was the last great expansion of the priory church, and probably was completed by the middle of the thirteenth century. The work added 100 ft. to the length of the church, and must have made a vast difference in its internal effect. The Norman east wall was demolished, and two bays of $19\frac{1}{2}$ ft. were added to the quire. The sleeper foundation was not continued eastwards, but four solid foundations of flint concrete were made for the piers of the extension. These are of different shape, the western pair being squares of 6 ft. 6 in., placed normally to the axis of the church, the eastern

pair circular below, diamond-shaped at ground level. The foundations of the reredos and of screen walls between the piers were also found. The reredos foundation consisted of three stone arches with flint concrete between. These arches were constructional only (fig. 6).

The aisle wall foundations are of very heavy flint concrete nearly 6 ft. in width, with square buttresses opposite the piers. They extend one bay beyond the eastern pier, before returning to the entrance of the Lady chapel. The latter is 35 ft. in length by 30 ft. in width internally, and ends in an east wall, the foundations of which have been reinforced on its east side at a later date by an additional wall of concrete 3 ft. thick containing lumps of worked stone from demolitions.

Against the north side of the westernmost buttress of the north aisle wall was a small stone platform, 6 ft. by 3 ft., which from its arrangement we thought might have been the base of a stone cross overlooking the grave-yard. Alongside the next buttress are some flagstones. It was close to the north-east corner of this aisle that the first find was made—the interment with the spur, already referred to. To the east of this aisle the great number of stone chips, with some spoiled stones, were turned up, which indicated the mason's yard.



Fig. 6. Arch of reredos foundation.

A very interesting feature is the curve in the aisle wall soon after it leaves the transept. At first the line of the nave wall, slightly south of the line of the transept chapel, is accepted; then the wall is swung out 2 ft., so as to give a breadth for the ambulatory of $15\frac{1}{2}$ ft.

The plan of this extension, as was pointed out to us by a Fellow of the Society, Mr. Sydney Kitson, is almost identical with the extension eastwards of St. Augustine's Abbey, Bristol. So close is it, indeed, that it is impossible not to believe that the builders of Bristol had Merton in their minds. St. Augustine's extension is a little later (1300-50), and one bay larger. The description given of it by our Fellow Mr. Roland Paul in his account of St. Augustine's in *Archaeologia*, vol. lxiii, might have been written of Merton, and we quote it here:

The new scheme, as can be seen by the plan, was to rebuild the eastern arm on a much larger scale. The new quire and presbytery were of five bays with aisles, and east of this was a Lady Chapel of two bays. . . . The plan adopted by Knowle enabled him to build

a large part of his new work without disturbing the Norman presbytery and high altar; that is, to complete the Lady Chapel, and certainly the easternmost bay of the presbytery. The extra width given to the aisles would almost have enabled him to build the outer wall on the south side.

3. PAVEMENTS AND OTHER REMAINS IN THE NAVE

Indications of the arrangement of the nave of the church are found in certain patches of pavement which have come to light and some masses of concrete that are not very easy to explain. The most important piece of paving is



Fig. 7. Paving tiles. ($\frac{1}{2}$)

just west of the entry to the crossing. Here sufficient was found, during the excavations of the Metropolitan Water Board, to indicate the character of the paving at this point across the whole breadth of the nave. The design consists of a stone paving 14 ft. broad, with tile edging $6\frac{1}{2}$ ft. broad on each side. The tile edging consists first of a band of patterned tiles placed diamond-wise next the stone flags; and then of red flooring tiles, placed square, and seven deep. The latter measure just under 7 in. square, the former $5\frac{1}{4}$ in. The stone paving itself appears to mark a division of the church, possibly the entrance to the quire or to some special area at the crossing. The division is marked by two lines of rectangular stones laid across the church. These are just under 1 ft. long by $8\frac{1}{2}$ in. wide. Up to them from the west comes a pavement of stones set diamond-wise, each nearly 10 in. square. Between and to the east of the rectangular bands the diamonds are smaller— $8\frac{1}{2}$ in. square. Opposite these transverse bands the tiles stop abruptly at the edge of the sleeper foundation. They are laid on sand over clay filling. The pavement appears to widen after passing this point.

At the opening of the crossing is a mass of hard flint concrete with a core rising to floor level which may be the disfigured foundation of one of the crossing piers. Just to the west of the transverse bands lies a mass of concrete that is frankly inexplicable. A heavy mass of flint concrete some 16 ft. long rests on the sleeper foundation and has along its southern edge a flint wall founda-



Fig. 8. Paving tile. ($\frac{1}{2}$)



Fig. 9. Paving tile. ($\frac{1}{2}$)

tion at floor level, 2 ft. broad. Against the latter on its inner (south) side is a large mass of later concrete 7 ft. broad by 12 ft. long, containing worked stone from demolition. A few floor tiles were in position on the east end of this, set to a ledge on the afore-mentioned wall-core. Large stones underground formed a descending abutment at the west end of this mass, towards the north.

There should be a column somewhere in the space occupied by these masses, but it is difficult to fit one in. It is tempting to think of the inner late foundation as a part of the pulpitum. At any rate, the character of the paving entirely changes immediately to the west of it. The tile borders have ceased and the stone flags cover the whole floor. They are no longer diamond, but of a fairly uniform breadth of about $8\frac{1}{2}$ in., and varying lengths. The stones are laid diagonally, the direction of the unbroken joints varying.

This paving is edged with a narrow strip of hard flint concrete, perhaps the foundation of a screen wall.

Ten feet west of the change of paving a double transverse line of rectangular stones may again mark some line of importance. It is halfway between the foundation just described and the last we have to deal with. This consists of a solid flint foundation, $10\frac{1}{2}$ ft. long by 4 ft. broad at the east end. On the inner (south) side it is edged with faced stones. It is surrounded, except at the

back, by pavement of the character last described, on which, on the west side, are superimposed some tiles.

A mass of foundation not unlike this in shape was noted by Mr. Quatermain when the trench was driven through in 1891, in a position that proves, on plotting, to be a corresponding position on the south side of the aisle.

Surely these two masses are the foundations of the side portions of the Rood screen. There would probably have been a central portion upon which the Rood stood, and in front of which the people's altar would be placed. This central foundation seems to have disappeared. There would have been a doorway on each side between the central and side portions.



Fig. 10. Capital from site of Abbey House.

The pavement of the remainder of the nave appears to have consisted of flagstones laid diagonally, of the type last described. The north aisle was for the most part paved with rectangular slabs of stone, $8\frac{1}{2}$ in. broad and of varying length, laid in courses at right angles to the wall. At the west end of the north aisle, however, the flooring was brown glazed tiles, $9\frac{1}{8}$ in. square. Four of these were found in position, and the seatings of others were clear throughout the last two bays. Wherever paving has been found, the crumbling remains of an earlier pavement have been found beneath the later paving.

4. INTERMENTS

The interments under the sanctuary have already been described. In addition to the six examples there of the cist of separate stones (which it is not unreasonable to suppose are the graves of priors or high officials of the priory) two burials outside the church call for notice. One was a stone coffin hollowed

out of one piece of limestone and containing the skeleton of a very large man, whose body had been crammed into the coffin with the greatest difficulty—and this although the internal length of the coffin was over 6 ft. The coffin was placed against the north wall of the aisle near the west end. There were grooves for a lid which no doubt disappeared at the time of the demolition, as the top of the coffin was at ground level.

The other was 30 ft. south of the north transept, and consisted of a slab with moulded edge resting on a surround of stone faced on the outside, the middle being filled with concrete. Presumably the interment is below.

DISCUSSION

MR. CLAPHAM welcomed an addition to the list of great churches of the Augustinian Canons: Merton Priory was one of the earliest, though certainly junior to St. Botolph's at Colchester, and it had a rival in Christ Church, Aldgate. Colchester as the earliest house had privileges granted by a papal court, but a fifteenth-century London petition suggested that Christ Church Priory should become an abbey as the senior house of the order. All must date a few years after 1100. Another point was the effect of affiliation in the propagation of the order, but the Augustinian Canons never reduced affiliation to the Cistercian rules. Later houses were colonized by a certain number of canons from various sources, the mother house being considered that from which their first prior came. It had been suggested in the paper that the early houses were modelled on the Cistercian plan: the Augustinian Canons came, however, between the earliest reformed order (Cluniacs) and the later (Cistercian and others), and architecturally halted between two opinions, having no stock plan. Some of their houses resembled one or other of the eleventh-century types, others the Cistercian: an example of the first was St. Bartholomew's, Smithfield; of the second, Lesnes Abbey, Kent. Newark (Surrey) had a church of another square-ended type, and Christ Church, Aldgate, was in a class by itself.

THE DIRECTOR congratulated the author on the success achieved in spite of adverse conditions. Few had been called upon to excavate in a railway station with an accompaniment of passing trains, and to obtain the necessary permission the greatest tact and diplomacy must have been exercised. The plan of the first church was simple, with a square end and square chapels in the transepts. It was distinctly of Cistercian type, but since the earliest English church to show a full Cistercian plan was Rievaulx, built after 1133-4, it was not likely that the Merton church was begun much before the middle of the 12th century. He thought that the plan showed the transepts too wide from north to south, and room for a passage should be allowed between the south transept and the chapter-house. The east end at Merton had been rebuilt on a grander scale, but the side walls of the new work turned inwards on approaching the transepts, and betrayed a change of purpose, the rebuilding of the whole church being evidently too formidable a task. The most difficult question was, how to read the history of the foundations in the western half of the nave. The claustral buildings were of ordinary type, and the chapter-house resembled Bristol in its dimensions. Excavation had revealed much and might reveal more, and it was a matter of infinite regret that Canon Westlake had not lived to submit his share of the work to the Society.

COL. BIDDER replied that the preliminary negotiations had been much facilitated by the

goodwill and interest of Sir Charles Morgan, Director of the Southern Railway Co. and by Mr. H. I. Bond, District Engineer; while the co-operation of the Metropolitan Water Board had been ensured by Lt-Col. J. B. P. Karlake, F.S.A., and Mr. H. E. Stilgoe, F.S.A., all of them being present at the meeting.

THE PRESIDENT expressed the cordial gratitude of the Society to Col. Bidder for the work so admirably carried out with his late colleague, and also to those gentlemen just named who had smoothed away most of the inherent difficulties of the task. They had revealed a building of national importance, and so helped to preserve it for all time.

XII.—*The Great Astrolabe and other Scientific Instruments of Humphrey Cole.*
By R. T. GUNTHER, Esq., M.A., Hon. LL.D.

Read 17th June 1926

THE recent discovery of the finest known example of an English Astrolabe of the largest size, signed by the Elizabethan maker, Humphrey Cole of London, has afforded an opportunity of gathering together some notes on all instruments now known to have been made by him, and of setting forth the chief biographical details of his life. The result shows that he must be regarded as the leading English scientific instrument maker of his century.

In all examples of his work we find craftsmanship of a high order of merit. Scientifically his instruments are an epitome of the knowledge of their day as set forth in the writings of Leonard Digges and others, to which they afford an invaluable supplement, giving evidence of the degree of accuracy in construction which was then obtainable. They constitute full proof of the careful attention to practical detail, which finds expression in the arrangement of parts and in the introduction of small auxiliary devices, that in these days would form the basis of special patents. They show their maker to have had a command of artistic methods of treatment, that has not been surpassed by any other English instrument maker. Cole's work fully substantiates the verdict of his contemporaries, that he was a 'very artificial workman' in the highest sense.

In addition, it must be remembered that he was the author of the first engraved map to appear in an English book; he was accepted by Lord Burleigh as an acknowledged expert in mineral ores and mining; and in virtue of his office as Sinker of the Stamps at the Mint and as understudy to Eloy Mestrell, he may have been responsible for much of the best coinage of the reign of Elizabeth. In short, he is a figure deserving far fuller recognition than he has hitherto been accorded.

For the opportunity of examining material relating to Humphrey Cole we must express our grateful thanks to the University of St. Andrews and to Professor H. Stanley Allen, the present fortunate custodian of the great Astrolabe; to the authorities at the Royal Naval College at Greenwich for permission to photograph Drake's Dial; to the Editor of the *Illustrated London News*; to the Librarian of New College and to the British and Foreign Bible Society for Cole's Map of the Holy Land; to Dr. Lewis Evans and to St. John's

College in Oxford for three other not less important instruments; to Mr. O. M. Dalton of the British Museum, and finally to the officers of the Society of Antiquaries for their ever ready help.

I. TWO-FOOT ASTROLABE, 1575.

Inscribed: *Humphridus Cole Londinensis hoc instrumentum fabricavit 21 die Maii A. Dni 1575* *. Diameter, 2 ft. Weight (incomplete), 33 lb. (pls. LXIII–LXVI).

This superb instrument is undoubtedly the finest example now extant of the art of an English astrolabist. It seems to have been in the possession

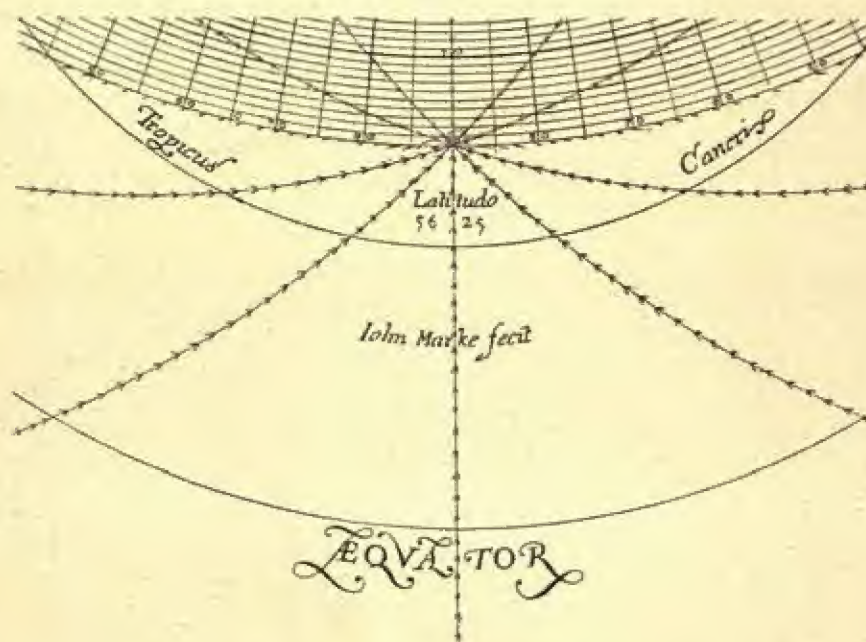


Fig. 1. Plate supplied by John Marke.

of the University of St. Andrews for the past two or three centuries, and was lent for exhibition with the Lewis Evans Collection of Scientific Instruments at Oxford, through the kind offices of the professor of Natural Philosophy, Professor Stanley Allen, in whose charge it now is. When or how it first went northward is unknown, but the inscribed plates provide a sufficient indication of its past history. Finished by Humphrey Cole of London on the 21st of May, 1575, two years before Sir Francis Drake started to sail round the world, it was designed to be fitted with three plates for use in various latitudes; one of them, now missing, may have been left blank, but another for latitude 52° is still extant, showing an original intention to use the instrument in the latitude of central England. The other two original plates for which there is room, are not now extant, but the place of one of them is taken by a plate engraved on

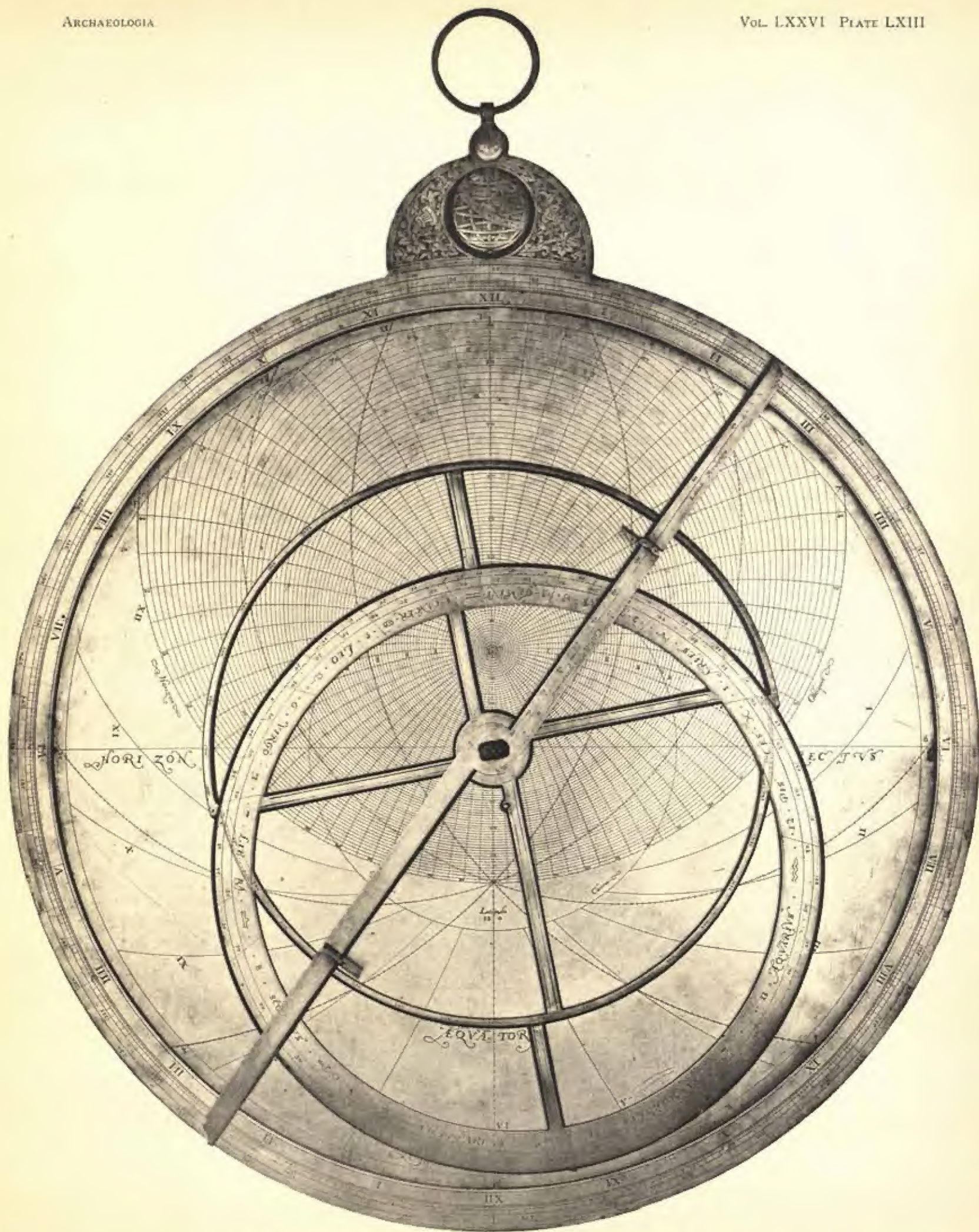


Fig. 2. THE TWO-FOOT ASTROLABE OF HUMPHREY COLE, 1575

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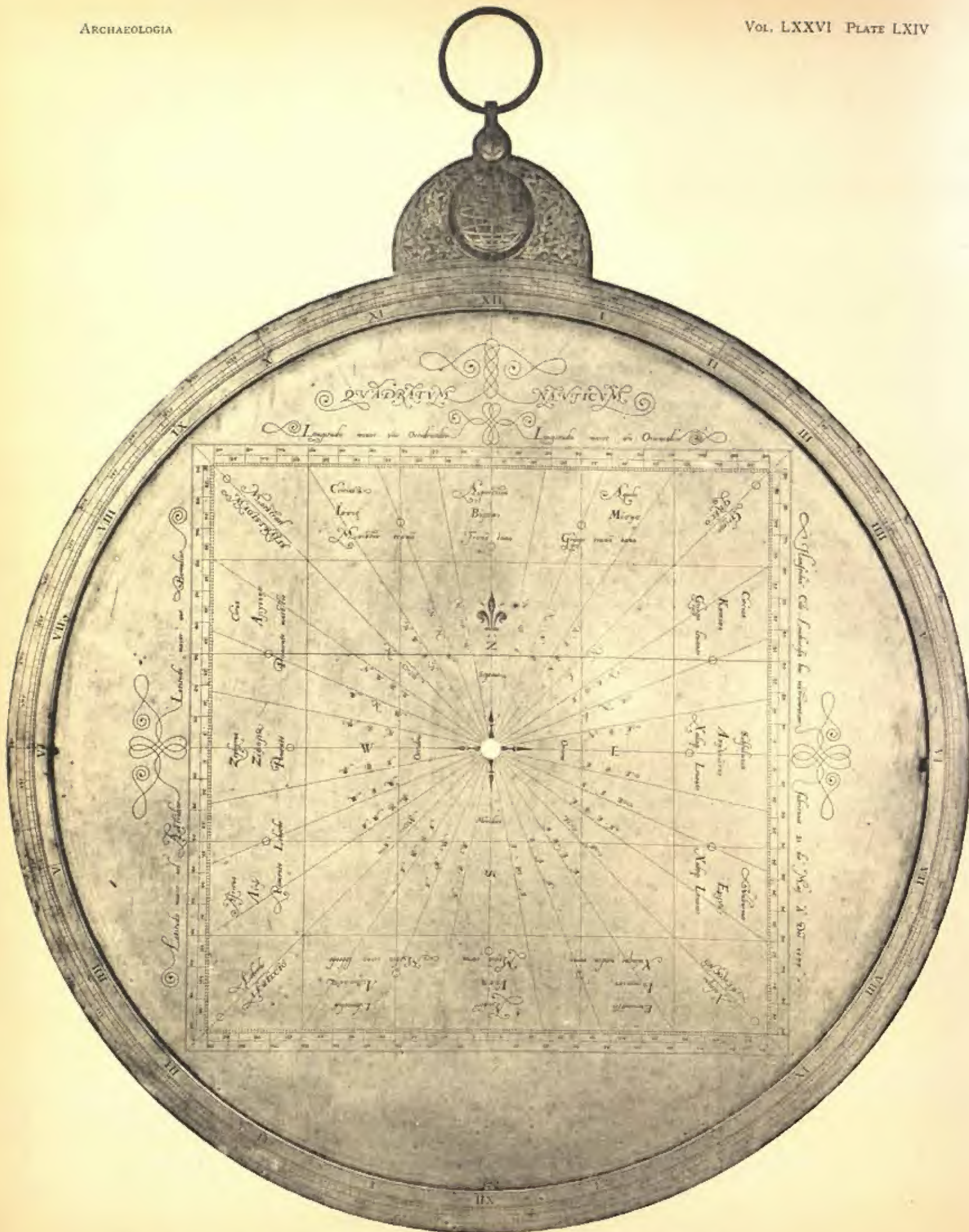


Fig. 3. 'THE QUADRATUM NAUTICUM', with Cole's signature on the right

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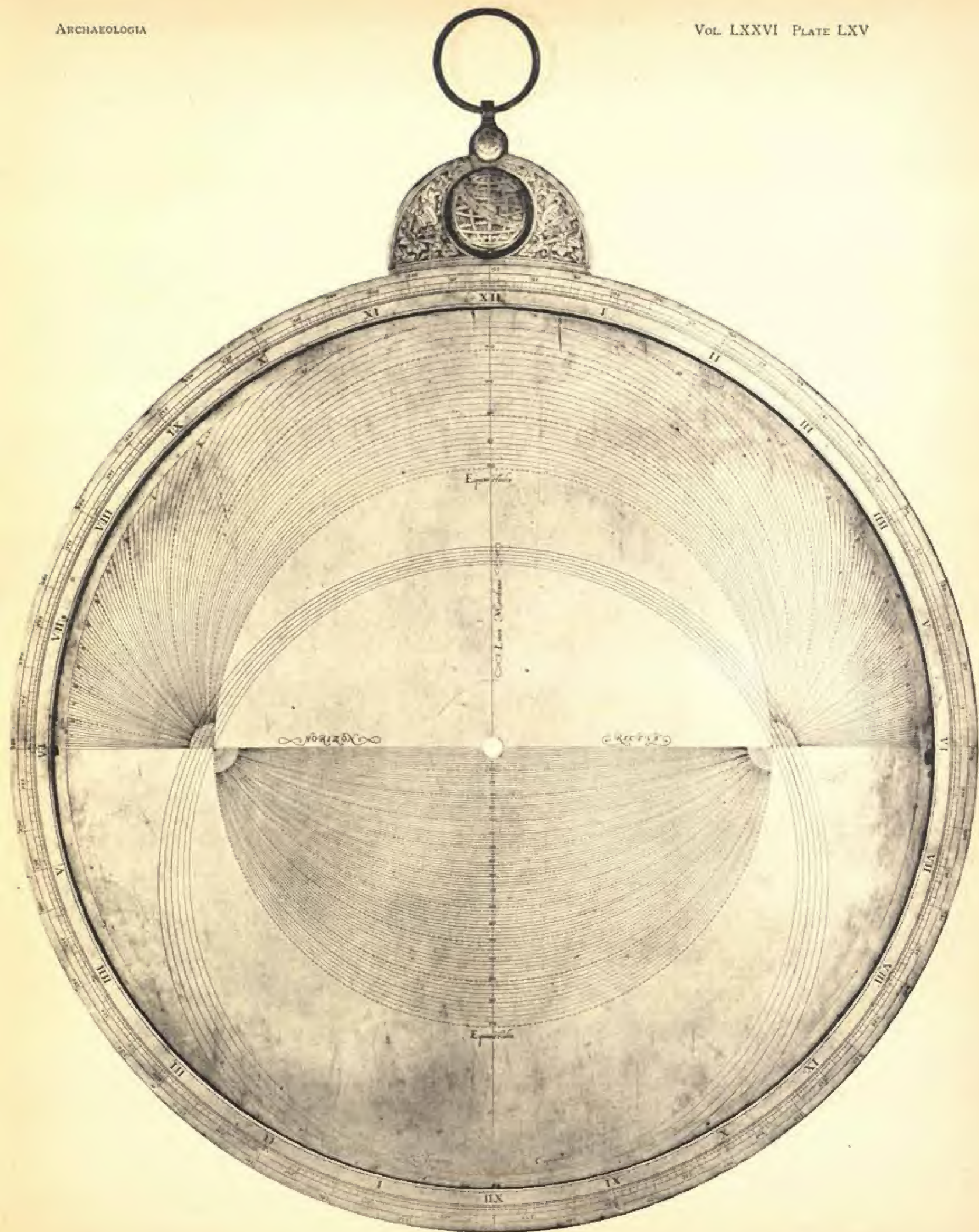


Fig. 4. THE TABLE OF HORIZONS

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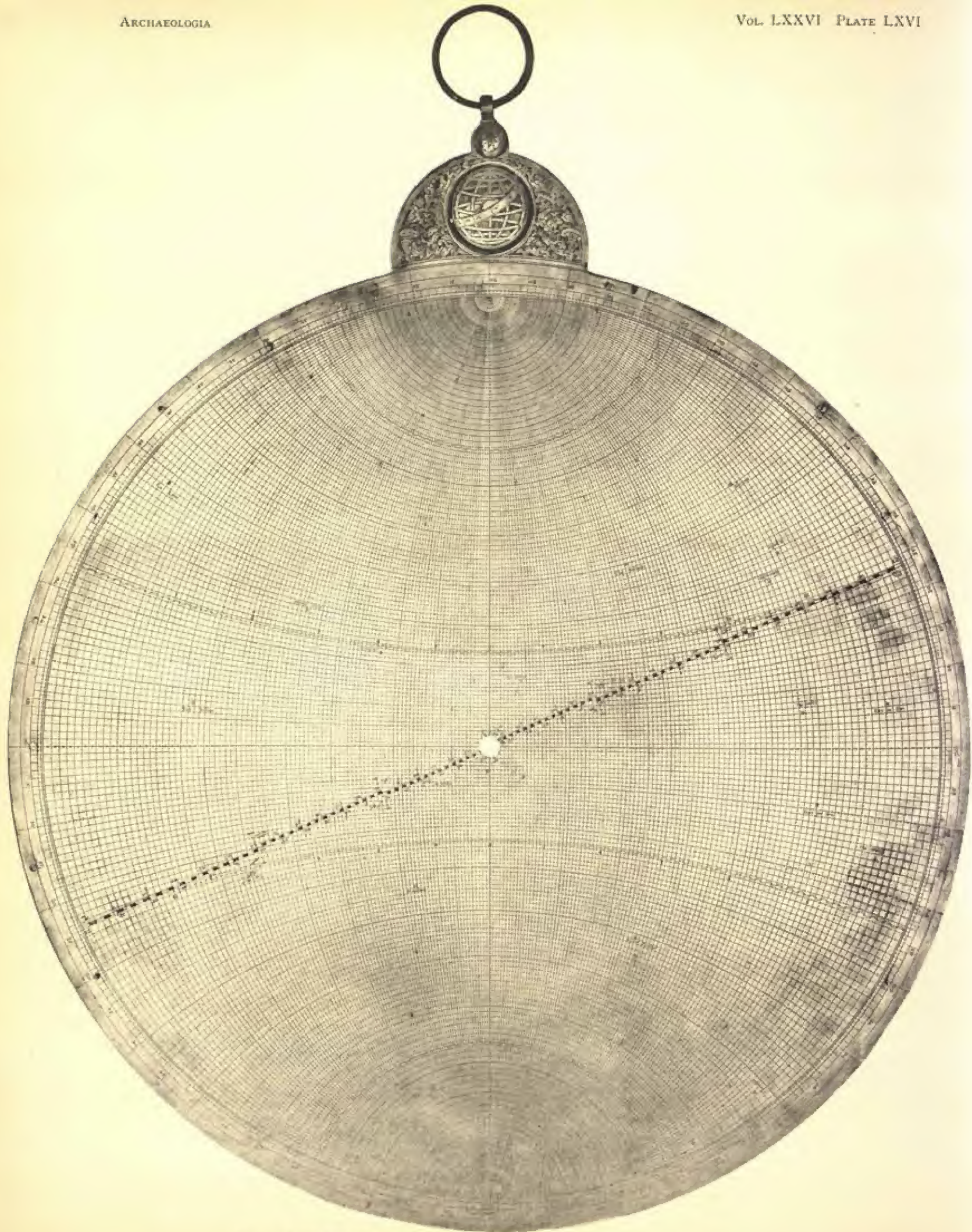


Fig. 5 THE PLANISPHERE ON THE BACK OF COLE'S ASTROLABE

Published by the Society of Antiquaries of London, 1927

one side by a different hand, and covered with a brown lacquer of which no trace could be seen on the other parts of the instrument, which appear to have been gilt. This additional plate, inscribed *John Marke fecit*, is for latitude $56^{\circ} 25'$, proving that the instrument, originally made for Harwich and possibly London, had been adapted for use in Scotland by Marke, who flourished about 1668, 'at the sign of the Golden Ball near Somerset House', where he sold Collins's quadrants of paper gummed on plates of copper and varnished.¹ He also made other instruments of precision for Scotland, as is indicated by the existence of an accurate sundial at Drummond Castle, made for John, Earl of Perth. It is signed *Johannes Marke Londini fecit* *Latt.* $56^{\circ} 20'$, 1679.

Now $56^{\circ} 25'$ lies somewhat north of the latitude of St. Andrews and Perth, and to the south of Dundee; it almost exactly corresponds to the latitude of the Palace of Scone. It will be remembered that in former days ships went up the Tay as far as Scone, for in one of the charters of the Abbey, Alexander I, having granted to the monastery the customs of ships coming to Scone, gave liberty to English ships to trade there, and promised them protection on payment of dues to the monks. The old royal palace may even have been occupied by a Stuart prince when the plate for the latitude of Scone was added to Cole's great astrolabe.

Suspension is by a ring, $2\frac{7}{16}$ in. in diameter, of unusual section, being square externally, but rounded on the inner or bearing surface, thus approximating to the original, diamond section of the rings of old Persian instruments. It is attached above a four-petalled rose ornament, below which is the large semi-circular bracket formerly containing a magnetic compass. The compass-box, $\frac{3}{4}$ in. in diameter, is gilt and marked with a line showing the magnetic variation.² The compass-box is closed by a hinged lid. Both bracket and compass-lid are richly chased on both sides; the former with a design of foliation and grapes proceeding from a cornucopia, the latter with an engraved armillary sphere, as in the case of the small astrolabe executed by Cole in 1574, and afterwards in the possession of Prince Henry; and, it may be noted, the same design occurs on V.C.'s portable dial of 1554.³

The rim of the mother, which is built up of four thicknesses of metal riveted together, is graduated to degrees numbered by fives and subdivided into $\frac{1}{6}$ th degrees. Inside this is a circle of twenty-four hours, numbered I–XII, I–XII, and subdivided to minutes of time.

On the inside of the mother is a finely engraved *Quadratum Nauticum*,

¹ *Philosophical Transactions*, 1668, p. 873.

² The advantage of the association of a compass needle with the astrolabe, for use as a surveying instrument is described in the *Scottish Geographical Magazine* for May 1927.

³ Figured in Gunther, *Early Science in Oxford*, vol. ii, p. 128.

evidently based upon the *Quadratum Nauticum* of Gemma Frisius, described in his *Cosmographia*, and figured in his *De Astrolabo catholico* 1556, fol. 152. On one side is the maker's inscription already quoted. Its sides, 14 inches long, corresponding to the cardinal points of the compass, are divided into 180 equal parts, numbered by fives from 0 to 90, starting from the mid-point of each line (pl. LXIV).

The middle of the quadrate is engraved with the thirty-two radiating lines or bearings corresponding to the points of the compass, the names of which are engraved upon them in English, Latin, Greek, and Italian. The compass-bearings intersect the marginal scales at the following points:

N	0	E
N by E	17	E by N
NNE	37	ENE
NE by N	60	NE by E
NE	90	NE

and similarly in all the other quadrants. By the application of these scales in accordance with the directions

Latitudo minor vel Australior Latitudo maior aut Boralior
Longitudo minor sive Occidentalior Longitudo maior seu Orientalior

a navigator could ascertain by how much he had increased or diminished his latitude and longitude after sailing on a definite course.

The tablets are for latitudes 52° and for 56° 25'. Both plates are engraved with two sets of hour lines for astrological use. One set of lines, marked between the tropics of Cancer and Capricorn and numbered I to XII, shows the planetary or unequal hours, i.e. one-twelfth part of the time between sunset and sunrise. The other twelve lines, numbered 1 to 12, radiate from the intersection of the meridian and the northern horizon. They delimit the twelve houses of Heaven and were used for astrological judgements. No 'linea Aurorae' is shown. On the reverse of the 52° plate is a finely executed 'tablet of horizons' engraved with ninety arcs of circles numbered by fives, and all intersecting where the Equinoctialis cuts the Horizon Rectus (pl. LXV). By the introduction of a complete set of these 'Horizontes obliqui Regionum' upon this plate, it was possible to determine the time of sunrise and sunset in all latitudes, thus rendering the instrument universal in the fullest sense. In other astrolabes, as for instance that of Krabbe of 1626, the horizons are restricted to a limited area of the surface of the globe, e.g. 24° to 66° for use in Europe. The same plate is marked with six other circles struck from centres on the meridian line near the intersection of the horizon circles for 47° to 52°. Their use is not known. The accuracy with which the arcs have been cut is sufficient testimony to the

great skill of the engraver. Indeed I know of no finer example of the work of an Elizabethan instrument-maker.

To secure truth of position of the plates their margins are notched for engaging in three hinged clips on the inside of the rim of the mother. This arrangement is believed to be unique: it is one of several examples of the ingenuity of Humphrey Cole in introducing into his instruments some useful constructional detail, for which a modern maker would take out a patent.

The rete is reduced to its simplest form: the zodiac and equinoctial circles are held in place by straight diametric bars nearly coincident with the Horizon Rectus and the Linea Meridiana, but arranged alternately on either side of them so as not to interfere with the taking of accurate position-readings. The circles are divided to $\frac{1}{2}$ degrees. No star positions are indicated by special pointers, but of course it would be quite feasible to find a desired star position by reference to its right ascension, i.e. sign and degree, and also to its latitude north or south of the ecliptic as measured by the degrees of *Latitudo septentrionalis* and *Latitudo meridionalis* inscribed along the fiducial edge of the alidade.

The sight-vanes on the alidade are of the slit and pin-hole type.

The central pin or axis of the instrument is missing. To judge by the miniature model of 1574 (see p. 279), it may have been attached to the rule and 'cursor brachiolus', a necessary adjunct to the use of the planisphere on the back of the astrolabe, but now missing. This planisphere, known as the Universal Planisphere of Gemma Frisius—a stereographic projection on the plane of the meridian—shows the position of twenty stars (pl. LXVI).

Lu. Lyrae	Cauda Ω	Apollo	Canis mi.
Arcturus	Cor Ω	Canopus	Extre. Eridan
Luci. Coronae	Cap. Medusae	Dex. hu. Ori.	Spica
Vult. Volans	Hercules	Canis Ma.	Fomahaut
Benan.	Hircus	Sinis. pes Orio	Cor \mathfrak{M}

The rule would have been graduated into 360 degrees, and the fiducial edges of the cursor brachiolus from 0° to 90° on one side, and from 0° to 100° on the other as in the instrument next to be described (pl. LXVIII, fig. 10).

The whole planisphere is a superb piece of engraving. The arcs of the circles have obviously been struck with a beam compass of considerable radius, and they all converge to the poles with a precision that has never been excelled by the old instrument makers. The use of such a planisphere for finding the time is described by Gemma Frisius¹ as follows: First the altitude of the sun is observed; then the rule is first set by the peripheral circle of degrees to the latitude of the place, and the tip of the brachiolus is moved along the circle of

¹ G. Frisius, *Cosmographia*, c. 1584.

the sun's declination to the presumed hour. The cursor is then clamped in position, and the rule is slewed back so as to coincide with the equator. If the point of the brachiolus be then found to fall on the circle of altitude observed, the presumed hour is correct. If the brachiolus indicates a greater altitude the hour is nearer midday; if a less altitude, the hour is further from midday than was supposed. It was a method of trial and error, cumbersome in use, but described in several of the treatises of the period. We do not know the extent to which it was used by the non-academic public.

II. THREE AND A HALF INCH ASTROLABE, 1574


Brass, water-gilt. Signed '*Made by Humfrey Cole 1574*'. Diameter, $3\frac{1}{2}$ in. Weight, 6 oz. 1060 gr. (pls. LXVII, LXVIII).

This Astrolabe was added to the national collection in the British Museum about 1855,¹ and is of special interest because it is to all intents and purposes a miniature model of the great two-foot astrolabe which Cole completed in the following year, and, being almost complete in every detail, may be used as a pattern by which the missing parts of the larger instrument can be restored. The history of this exquisitely contrived example of Cole's work is written partly upon the astrolabe itself, and partly upon the silver fastenings and plates of the case of green velvet in which it is contained. In the centre of the cover of the box is an oval plate, engraved with the motto, ICH DIEN, and the three feathers of the Prince of Wales in a coronet formed of crosses and fleurs-de-lis alternately, and the letters H.P. From this it appears to have belonged to the son of James I, a view which is confirmed by an inscription upon the instrument itself:

A. D.

Henr: Princ: Magn Brittan

The plates of the hinge bear the words *Inter omnes*, evidently intended to be read before the inscriptions upon two silver bosses on the cover, *Scientia virtusque Auctoritas ei* and *foelicitas Illius crescat in eternum*.

The clasp is marked with a monogram, an M with a pentacle, , of which the meaning is obscure, though it is just possible to spell out of it the letters of HUMFREY COLE. The silver plates are embellished with fleur-de-lis borders.

Description of Astrolabe. The bracket for suspension, supported on two scrolls, is hollowed out to contain a magnetic compass, half an inch in diameter, which is ordinarily concealed by a pivoted cover ornamented with an armillary sphere, a design repeated on the other side of the bracket, and on Cole's great

¹ *Archaeological Journal*, xii, p. 292. It was purchased at the sale of Mr. Bernal's collection.

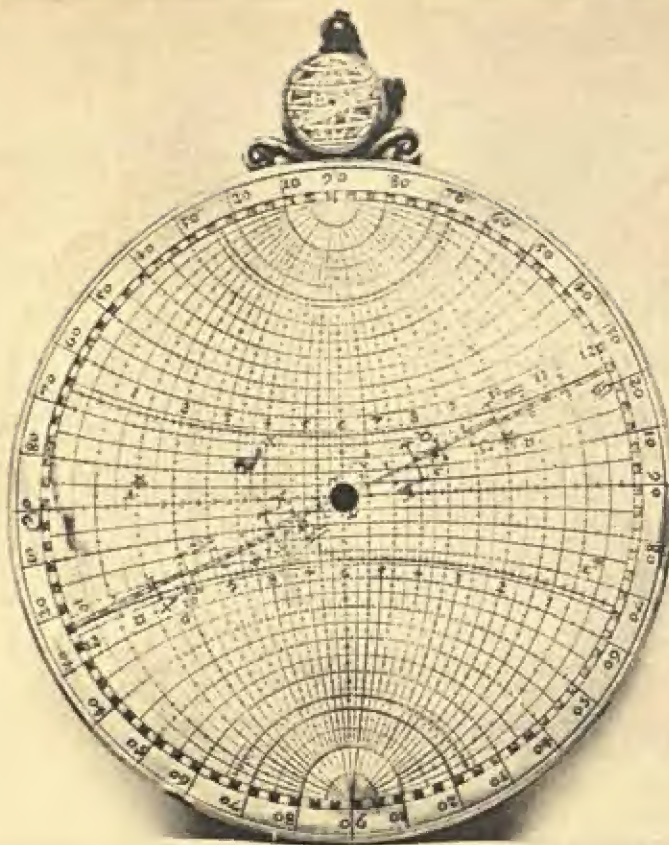


Fig. 6. The Planisphere

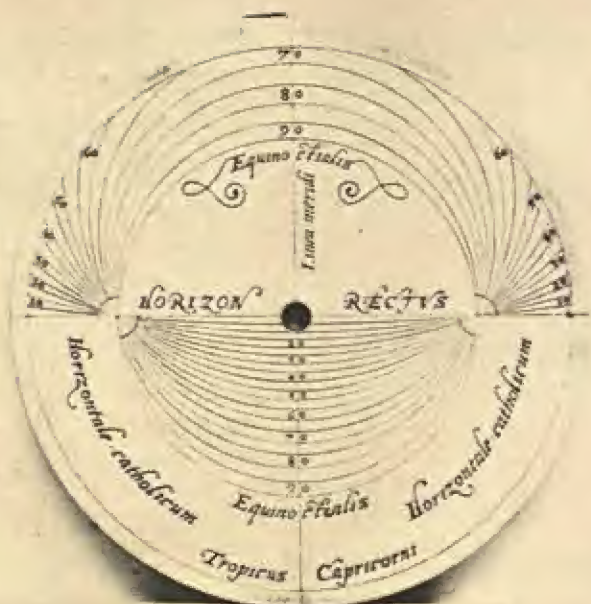


Fig. 7. The Tablet of Horizons



Fig. 8. The Quadratum Nauticum



Fig. 9. The Calendar and Horary Plate

PRINCE HENRY'S ASTROLABE, 1574

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Fig. 13. The Case of Prince Henry's Astrolabe

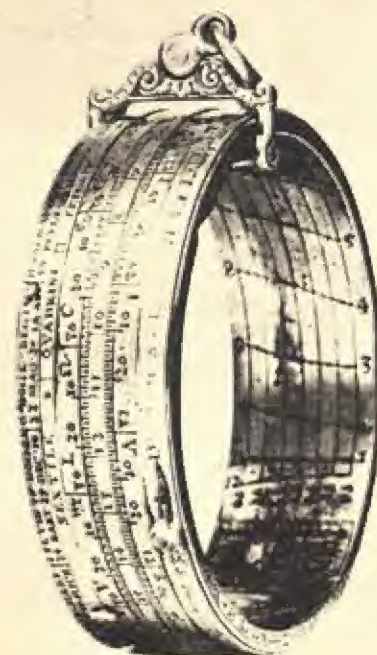


Fig. 14. Ring Dial by Humphrey Cole



Fig. 10. The Rule

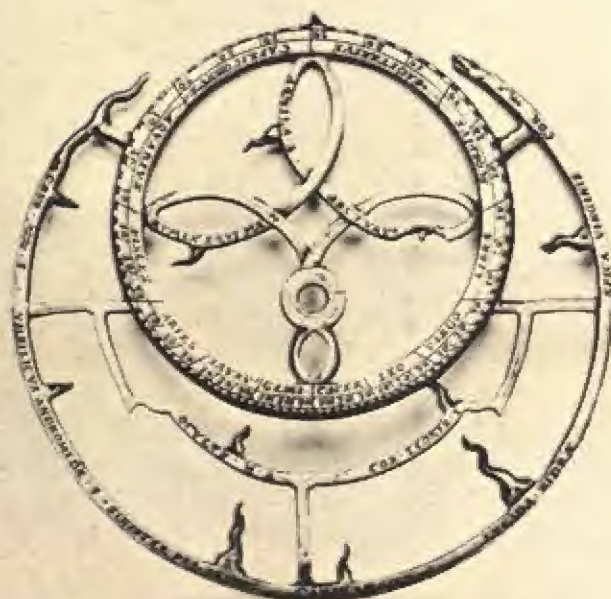


Fig. 12. The Rete

Fig. 11. The Alidade

PARTS OF PRINCE HENRY'S ASTROLABE, 1574

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astrolabe of 1575. The rim of the mother is engraved with two circles, an outer circle of twenty-four hours, I–XII, I–XII, and an inner circle of degrees numbered by tens 10–360, 0° corresponding to the hour of VI on the outer circle.

The Rete is designed for thirteen stars. The names of three stars, *Aquila 2*, *Homer² Equi ma 2*, *Arcturus*, are borne on a delightfully disposed 4-looped band within the zodiac circle, while outside the zodiac we find COR ♀, SPICA VIRGINIS, LVCIDA HIDRAE, CANIS MAIOR, COR LEONIS 1, SINISTER PES ORIONIS, OCVS ♂, VMBILICUS ANDROMEDAE 3, CRUS ≈ 3. The head and tail of the Dragon are clearly indicated.

Over all is an alidade pivoted on the central pin, and held there in a manner which surpasses in simplicity and ingenuity all other similar fixings known to astrolabists. Instead of the conventional slotted pin and wedge, the pin is channelled with a circular groove gripped by the pincer-like ends of two flat bars pivoted to the base bar of the alidade. When closed these bars are kept in position by two small studs, and the alidade bar looks solid; but when opened, by slightly raising the bars so as to clear the studs, and by slewing them sideways, the head of the pin is cleared, and the composite alidade can be removed, and the several parts of the astrolabe separated.

The sight vanes are of the pin and pin-hole type, fixed 2½ in. apart. The engraving between the sights of the alidade is all upon the movable bars. It reads

HORAE OCCA ☉												1	2	3	4	5	6	7	8	9	10	11	12												
☉	ALHO OH	21	11	01	6	8	7	6	5	4	3	2	1	00	90	80	70	60	50	40	30	20	10	01	20										
																								LATITUDO SEPTEN		LATI MERI									

On the inside of the mother is a neatly engraved QVADRATVM NAVTICVM, a reduced copy of the one in the larger instrument, with the sides of the quadrate divided into parts numbered by tens, 10 to 90, each way from the four cardinal points. Along two sides of the quadrate are the directions: *Lati. mi. vel Austr.* *Lati. ma. aut Bore.* and *Longi. mi. siue Occi.* *Longi. ma. seu Orie.* Along the third side is the maker's signature *Made by Humfrey Cole 1574*, and along the fourth, by a later hand, the inscription about Prince Henry (pl. LXVII, fig. 8).

The tablets are four in number, three inscribed on both sides and one blank. Two inscribed plates have almucantars drawn for every 5 degrees. One is for latitudes 51° 30' (London) and 52° 30' (Ely); the other is for 53° 40' (Hull) and 55° 00' (Newcastle or Carlisle).

The third plate is engraved on one side as a 'tablet of the horizons', a '*Horizontale catholicum*'. Nine horizons, one for every 10 degrees, are drawn

between the '*Tropicus Capricorni*' and the '*Equinoctialis*'. The plate is crossed by the *Horizon Rectus* and the *Linea merid* (fig. 7).

On the other side is a useful tablet (fig. 9) with

- (a) Circular zodiac and calendar scales in which the first point of Aries corresponds to March 11.
- (b) Scales of *Vmbra Recta* and *Vmbra Versa* graduated 2, 6, 8, 10, 12, 10, 8, 6, 2.
- (c) A diagram showing the Equal Hours, *Horae ante-me* [*ridiei*], numbered 1-12, and *Horae post meri* [*diei*] 1-12, and the *Horae inaequales*, I-XII, or planetary hours, which divide the time between sunrise and sunset into twelve equal portions, and therefore vary in length according to the season. On the back of the astrolabe is the horizontal projection of the sphere, which, probably by the advice of Gemma Frisius, had been adopted by the Arsenius family for their instruments from the Sappea Arzachelis: its invention is attributed to Al-Zarqali (A. D. 1029-87), and was known to medieval astronomers through a work by Ahmad b. M. b. 'Othman al-Azdi, who died in Morocco about A. D. 1340.

Al-Zarqali, recognizing the inconvenience of having to use a separate tablet for every new latitude, tried to construct a universal instrument by substituting a horizontal projection of the sphere for the usual polar projection. One of the equinoctial points was taken as the centre of projection and the solstitial colure, or great circle passing through the poles of the equator and the solstitial points, was taken as the plane of the projection. The centre of projection is crossed by the ecliptic marked with the signs of the zodiac; six on either side of the centre, or first point of Aries. The signs are delimited, for the sake of clearness, by cross-lines, three to a sign at every 10 degrees. Upon the sphere are marked six star-positions A, B, C, D, E, G, readily indentifiable by a list of star-names inscribed round the rim of the instrument. Proceeding from the suspension bracket in clock-wise direction, we have

M. Crus ☿. ♄. h	A. Aquila. ♂. ♀	B. Lanc ent°. ♀. ♂
C. Cor Ω. ♂. ♀	D. Oculus ☿. ♂	E. Cane° ma°. ♀. ♂
F. Spica ♀. ♀. ♂	G. Cor ♀. ♀. ♂	H. Lucida hyd. h. ♀
I. Arcturu°. ♀. ♂	K. Vmbilic° Andr. ♀	L. Orion. ♂. ♄
[Swivel]		

The projection of the sphere is traversed by a three-jointed index or *brachiolus* mounted on a *cursor* which can be slid along a horizontal rule fixed to the pin, and is thus rotatable about the centre of the instrument. This rule is graduated along both margins from the centre to 90° at the end, from 90° to 270° along the lower margin, and from 270° to 360° at the centre. It is slotted above and below, and into these slots the *cursor brachioli* fits. The cursor appears to have been originally fitted with a clamping screw, now missing (figs. 6 and 10).

III. JUGGE'S UNIVERSAL PORTABLE DIAL, 1568

Made in gilt brass in book-form measuring $2\frac{7}{16}$ in. by $2\frac{1}{2}$ in. by $\frac{13}{16}$ in. It consists of five parts hinged together and closed by two clasps. It is now at Oxford in the Lewis Evans collection (figs. 15-21).

It is inscribed

HVMFRAY · COOLE · MADE · THIS · BOKE · ANNO · 1568



Fig. 15. Cover of Dial with Badge of Richard Jugge.
(From the *Illustrated London News*, 14 August 1926).



Fig. 16. The Canting Badge of Richard Jugge.
(From Cole's *Map of the Holy Land*).

The upper cover of this exquisite little compendium of instruments is strongly reminiscent of the engraved title-page of a book, and there can be no doubt that its decoration was designed as such. The technique is that of a craftsman acquainted with the engraving of copper-plates. A strap-work frame is combined with fruit, foliage, snails, and squirrels; and in the centre, within a circle, are three thorn-trees in leaf and flower, with a nightingale

singing on one of the branches, and in a thrice-folded ribbon on top, 'IVGGE', its song four times repeated. When I learnt that there was an Elizabethan publisher of the name of Richard Jugge, who moreover printed an almanack, it seemed fairly clear that Cole's dial was intended to be a Jugge almanack for the pocket, executed in metal. This supposition is now proved correct by the finding of two of Jugge's printed title-pages with a similar device upon them (p. 308), and even more convincingly by Jugge's canting badge on Cole's

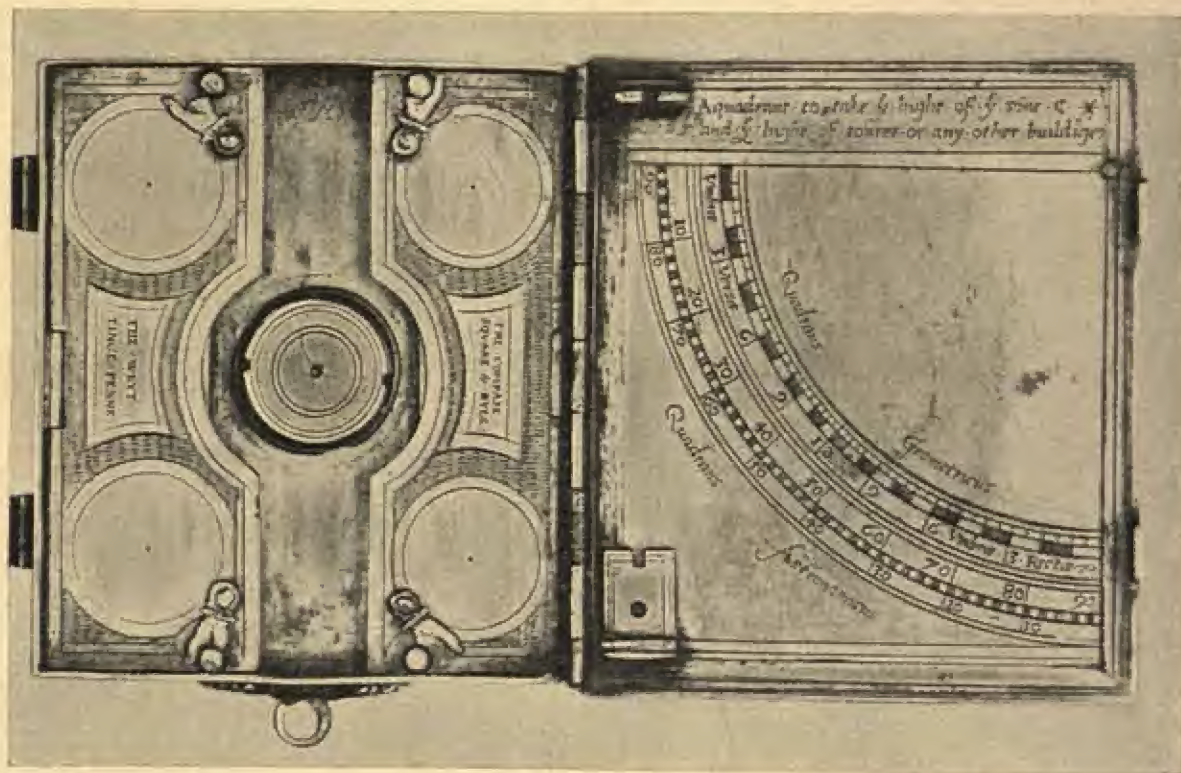


Fig. 17. The Cases for Mathematical Instruments and the Quadrants.

Map of the Holy Land, described on p. 306. In the year 1568, Richard Jugge became Master of the Stationers' Company.

Our instrument of 1568 thus antedates by thirty years the earliest recorded use in literature of the 'jug' of the nightingale. 'lugging nightingales are sweetly singing' occurs in 1598.¹

Inside the cover of the dial is '*A quadrant to take the height of any tower or any other building*'. The outer limb of the quadrant, a '*Quadrans Astronomicus*', gives degrees each way; an inner '*Quadrans Geometricus*' gives scales of '*umbræ versæ*' and '*umbræ rectæ*' divided to 12. There are two hinged sights fixed near the hinge of the cover.

¹ Yong's *Diana* 427 (N.E.D.).

The second part consists of two shallow recesses with hinged covers to them, the covers wider than the recesses and projecting beyond them, but cut away in the middle so as to clear the bottom of a compass box that shows between them. The closed covers are secured by swivel catches in the shape of hands, which engage with studs.

On one cover is 'THE COMPASE · SQUARE & RVLE', and on the other 'THE WRITING · PENNE': all now lost. On the other side of this second part,



Fig. 18. Sundial closed.



Fig. 19. Equatorial Sundial open.

in a circular recess, is a gilt brass plate divided into half degrees, and numbered at each tenth degree from 10 to 360, beginning at the North. Within this circle is 'a geometrical square', divided right and left from the middle of each side to the angle and inscribed from 0 to 12. Within this again is a circle inscribed with the thirty-two points surrounding the magnetic compass (fig. 20).

The third or central part of the instrument consists of a universal sundial. When the instrument is opened out flat, a vertical plate rises from the hinge, cut away to form a semicircle, just clearing the hinge and allowing an hour ring, $2\frac{1}{16}$ in. diameter, to be pivoted to its horns (figs. 18, 19).

The gnomon, pivoted on the XII to XII hour-line, is cross-shaped with a quadrant arc below, each side being divided into 90° , the edge of the arc engaging in a notch in the semicircular support plate. Latitude adjustment was obtained from a small plummet, now missing. The sundial with its support and gnomon fold up in a recess in the fourth portion of the instrument, on the bottom of which are inscribed THE LATITUDE OF · PRINCIPALL · TOWNES and the maker's inscription (fig. 20).

TABLE OF LATITUDES OF TOWNS

Lisbon	39°	38'
Bruxella	51	
Antwerpia	51	28
Gandanum	51	24
Amsterdama	52	40
Middelburgum	51	48
Dover	51	Exitur 51
London	51	34
Oxforde	51	50
Bristowe	52	
Norwiche	52	30
Leiseter	52	50
Harforde	52	50
North hamtö	52	50
Notingam	53	
Lincole	53	15

Toletū	39°	56'
Rone	49	
Tolosa	43	30
Parisius	47	55
Monspessulanus	42	5
Marsilia	43	6
West chester	53	10
Yorke	54	
Newcastell	55	
Barwicke	56	50
Edenboro	57	
Dantiscum	54	
Lubecum	54	48
Colonia	51	
Francophordia	50	10
Augusta	47	12

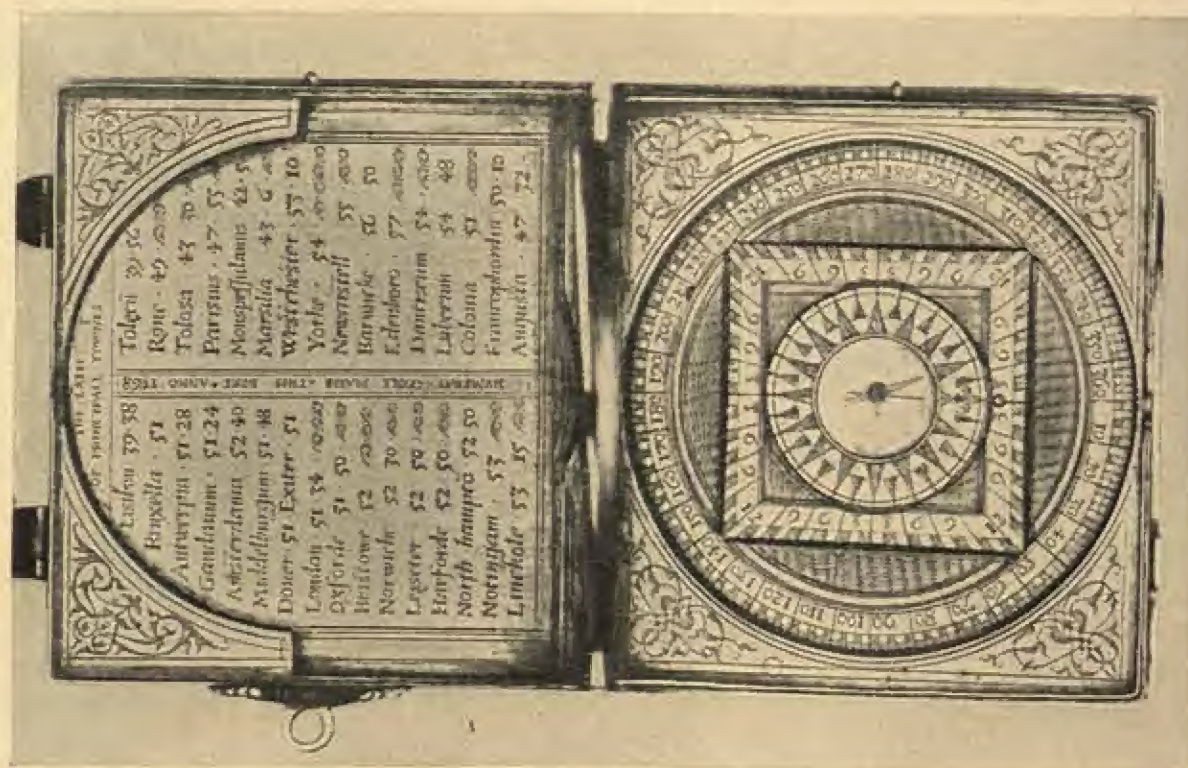


Fig. 20. The Table of Latitudes and the Compass and Quadrate.

(From the *Illustrated London News*, 14 August 1926).

Inside the cover at the back of the fourth portion a gilt calendar plate gives the golden letters, the dates of the sun's entry into the signs of the Zodiac, and the following saints' days:

Circu:	Epiph:	Hilar:	Cô. Pau:	Purifi:	Valent:	Mat:	Annu:	Ambro:
Georg:	Marc:	Phi. lac:	Iô. Evā:	Auguș:	Barnā:	Ioā. bap:	Pe. Pa:	



Fig. 21. The Calendar.

The remainder of the calendar is missing, but the whole arrangement of the columns suggests that it has been copied from the General Calendar at the end of Digges's *Prognostication*, 1555, and the hinges show that at least one extra leaf of gilt brass and a cover were included in the original dial. These have been replaced by a roughly fashioned modern plate and hinges. The missing six months of the calendar would have filled the page facing, while the verso of the leaf is likely to have been engraved with Tide and Lunar Tables similar to those in V.C.'s pocket book of 1554.¹

IV. DRAKE'S DIAL, 1569

A composite oval pocket dial of gilt brass, measuring 3 in. by 2 in. Now in the possession of Greenwich Hospital (pls. LXIX and LXX).

¹ Gunther, *Early Science in Oxford*, ii, p. 282.

An engraving of this important instrument under the misleading title of Sir Francis Drake's 'Astrolabe', appeared in the *Illustrated London News* for 14 June 1856. It was believed to have been constructed for Drake prior to his first expedition to the West Indies in 1570. Subsequent owners are stated to have been members of the Stanhope family, the Right Hon. Philip, fifth earl of Chesterfield, who gave it in 1783 to the Rev. Francis Bigsby, who had recently married the Hon. Frances Stanhope, widow, Chesterfield's stepmother. In 1812 it passed to Robert Bigsby, who presented it to William IV, who gave it to the Royal Hospital at Greenwich.

i. Both upper and lower covers are highly decorated with engraved designs which show careful planning, and recall the art of the engraved title-pages of books of the period. The design on the upper cover includes a central male figure holding a staff and standing over an eagle. Overhead is an arched canopy of strapwork with a draped curtain, above which is a pair of grotesque heads upon whose hair two snails are creeping. On either side sits a monkish scholar with ass's ears, reading a book; and below all, a cherub's head and two squirrels on a scroll support. The introduction of the snails and squirrels recalls the decoration of the Jugge dial, which had been finished by Cole in the previous year.

The centre panel on the other side is occupied by a figure of Prudence standing under a smoking lamp, and holding a staff entwined with a snake. She too has a draped canopy overhead and a bird (peacock or swan?) at her feet. To right and left, winged tadpole-tailed devils, with goat dewlaps, holding rosaries, act as supporters. Below, is a cherub-head between two peacocks. Every part of the space is occupied by foliage or other ornament.

The designs are framed in a border of rolls and beads, and the sides of the instrument are decorated with rope ornament.

ii. Inside the lid is 'AN INSTRUMENT TO KNOWE THE EBBES AND FLVDDDES', (fig. 24). It is essentially similar to the instrument on the back of Cole's Nocturnal described on page 294. The base-plate is engraved with three circles.

- (1) A circle of degrees numbered by tens to 360°.
- (2) A circle of hours I–XII, I–XII, for reading the time of high water.
- (3) A circle of points of the compass, which refer to the direction of the moon-at-change when it is high-water at the ports named in the tide table on the opposite leaf.

Over these are two rundles: the larger with a tooth index for setting to the desired point of the compass, bearing a circle of days numbered 1 to 30 in a clock-wise direction, and divided into quarters; the smaller provided with



Fig. 22. Upper Cover



Fig. 23. Lower Cover



Fig. 24. Tide Indicator



Fig. 25. List of Ports and Havens

DRAKE'S DIAL, 1569

Published by the Society of Antiquaries of London, 1927



Fig. 26



Fig. 27



Fig. 28



Fig. 29



Fig. 30

DRAKE'S DIAL, 1569

Published by the Society of Antiquaries of London, 1927

a lunar index and an aperture to show the phases of the moon. The surface is decorated with an arabesque design.

To find the time of high water at a port it is necessary to know (a) the age of the moon and (b) to refer to the following Table iii for the compass-bearing of the moon when the 'sea is full' at the particular port. Then the rundle of thirty days is set with its short tooth-index to the compass-bearing given in the table, 'there staying it firm with your finger', as Blundevile counselled, while the upper lunar index is turned to the age of the moon on the rundle of days, and its position read in the circle of hours. This last reading gives 'the very houre of full Sea that day in that place'. In the days when so many harbours were only accessible at high water, the great utility of such an instrument to the mariner was obvious.

iii. The Table of Lunar Compass-bearings for finding times of Tides at Ports (fig. 25).

PORTES AND HAVENS OF

THE NAMES OF PRICIPAL	S Spetes shew Quin Southe hāptō Porch- E y Well Hūber Anwer	S·B·W ȳ West end of ȳ Nore Red bā Aberdē 3 Ilāds	S·S·W Dover in Scot Coding Rode Barwic Holy Iland So to Tinmot Cro. Ila	S·W·B·S Burlige in the Baye Edē bor or leth in Scot Dundee S. Andr Graues end	S·W Londō From tinmot to flā borow head Hartil Pasag Bilban Alaredo	S·W Fox noze River Cowlai Staples Sait Se bastia S. Andr Grown Monge Mors	W·S·W Dartmō Plimot Faumo Scilli Milfor hauen	VROPE · WHAT MONE MAKETH
	E y Well Hūber Anwer	E·B·S Bristo	E·S·E Saint Georg* Ilands	S·E·B·E At Alde and at Saine	S·E Laisto Roade Harwi	S·E·B·S Stand which Douer	S·S·E Orfor Orwell Wand*	
Foy Lin	W·S·W Lāds end at ȳ Gulf	W·S·W ye coas of Irel fro . wa terfor to kiġ	head do . alōġ ye coas of nor mādi Portlā	All ye coast fro wītertū to yerm ye lands end.	Rie Deipe Newe hauen Lux Lewys	Marget Bul Callis S·W Baion	W·N·W Colne	

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The dotted line across the Table represents the hinge of a flap which, when lifted, exposes the bottom of the compass box and an angular cavity. The catches for fastening the flap are shaped like hands with the index-finger extended.

iv. A Circumferentor. A separable instrument consisting of a magnetic

compass with a sight rule, a geometrical square graduated with scales of the shadows 3, 6, 9, 12, 9, 6, 3, and a divided circle of single degrees numbered in tens 10 to 360 (fig. 29).

This instrument is of very great interest because it comprises all the elements which Cole is likely to have introduced into the horizontal circle of his theodolite, described below.

v. An Equatorial circular Dial with a quadrant graduated 10° to 90° Inscribed + *Humfray Colle made this diall anno 1569* + (figs. 26–8).



Fig. 31. Table of Latitudes.

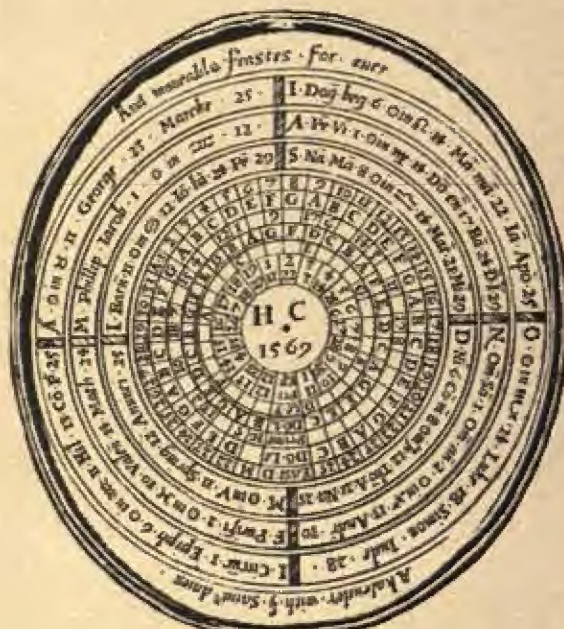


Fig. 32. The Calendar.

vi. Table of Latitudes of English and European Towns (fig. 31).

vii. *A kalender with y. Saint^s daies And moueable feastes for euer.* In the centre are the maker's initials and the date of the instrument (fig. 32).

viii. On the inside of the cover is an 'instrumentum solis et lunae', inscribed '*The course of the Sonne and Mone through 12 Signes*' (fig. 30).

It comprises :

1. A circle of Months, divided into days.
2. A circle of Signs, divided into degrees.

The first of Aries corresponds to the $10\frac{1}{2}$ March.

3. A rundle with sun index; the rim is graduated to $29\frac{1}{2}$ days.
4. A rundle with an index, an aperture for showing the phases of the moon, and with geometrical figures of the aspects of the planets. The diagram

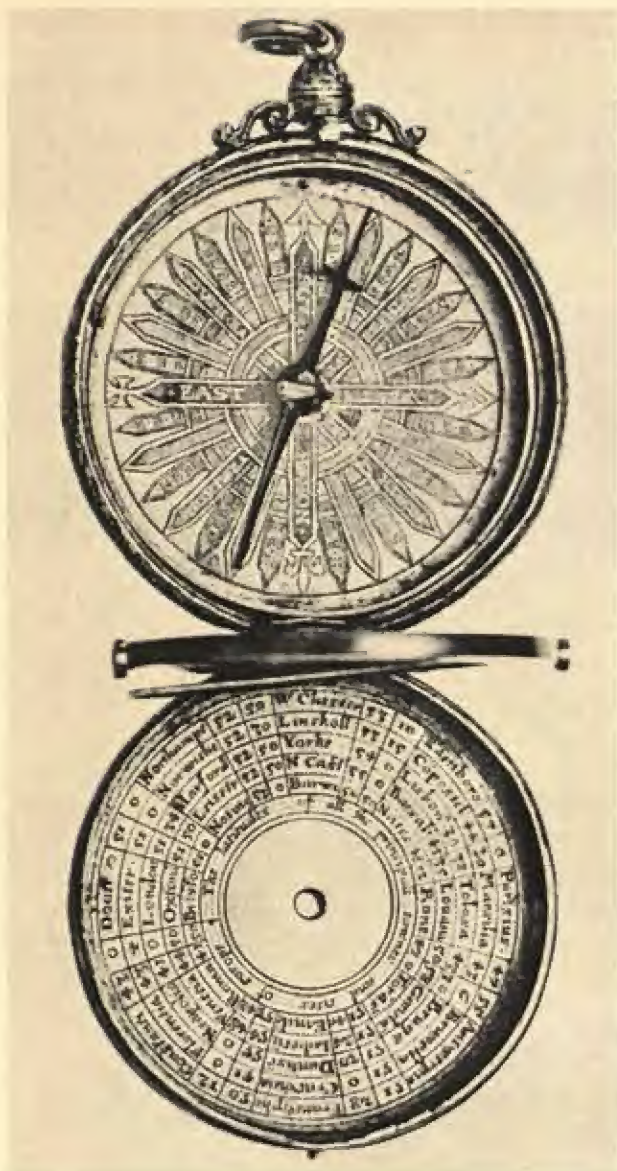


Fig. 34. Compass and Latitude Table
(British Museum)

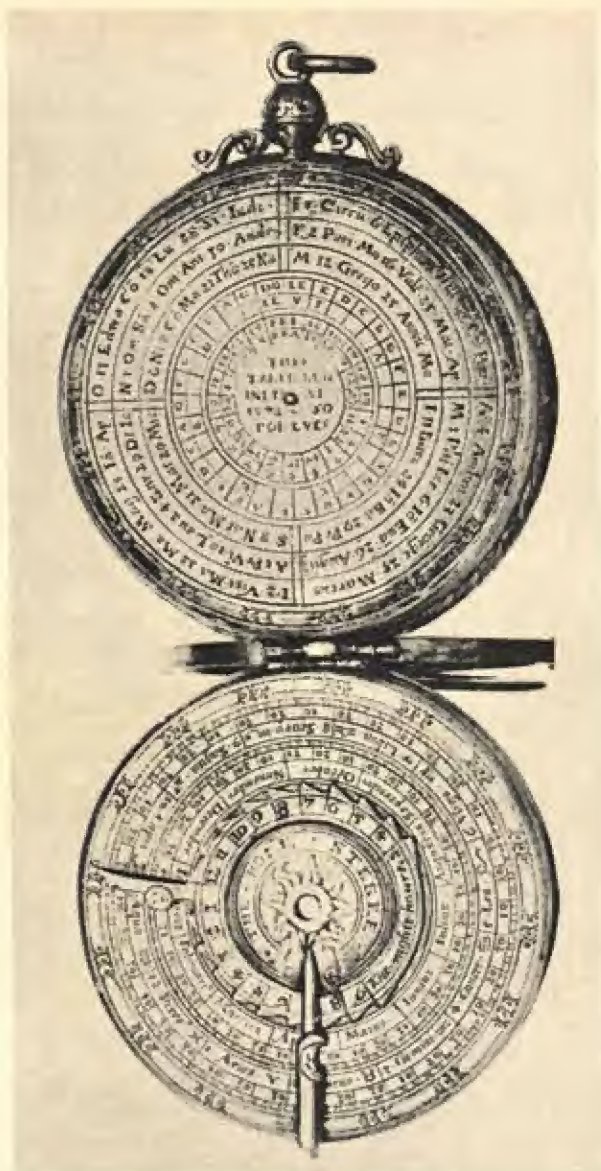


Fig. 35. Table of Sunday Letters, Calendar and Nocturnal
(British Museum)



Fig. 33. Equatorial Dial expanded for use
(Museum of Antiquities, Edinburgh)

UNIVERSAL POCKET DIALS, 1575

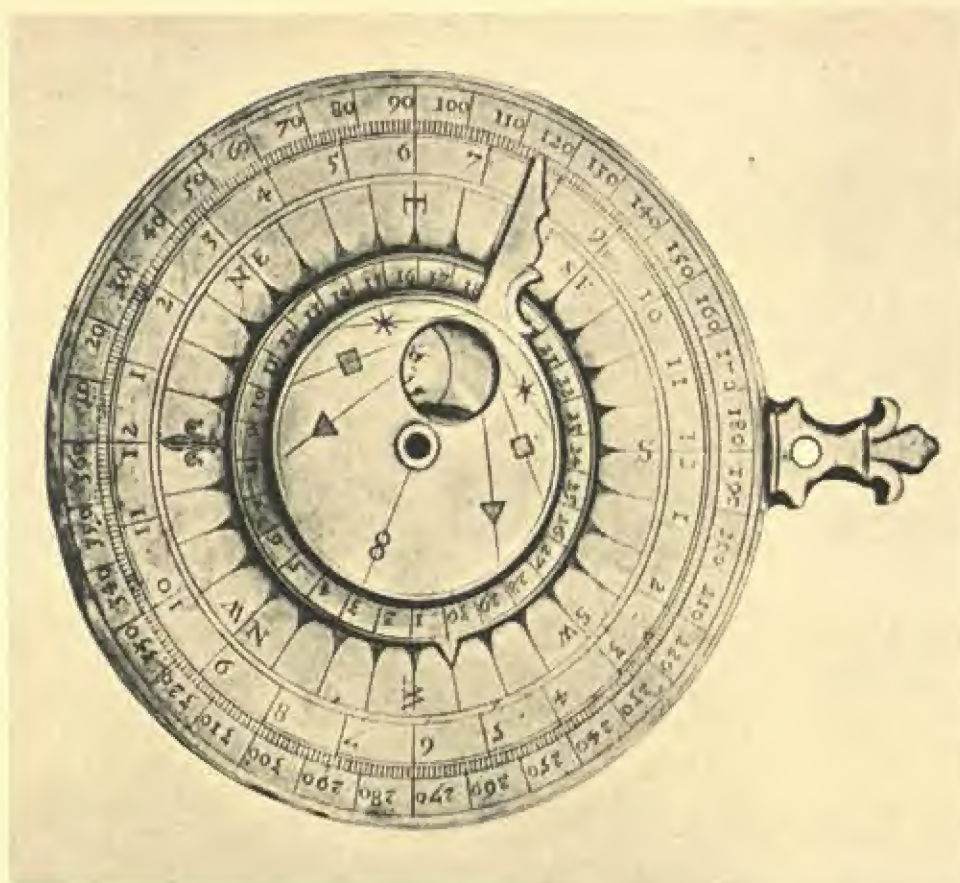


Fig. 37. TIDAL INSTRUMENT with Diagram of Aspects

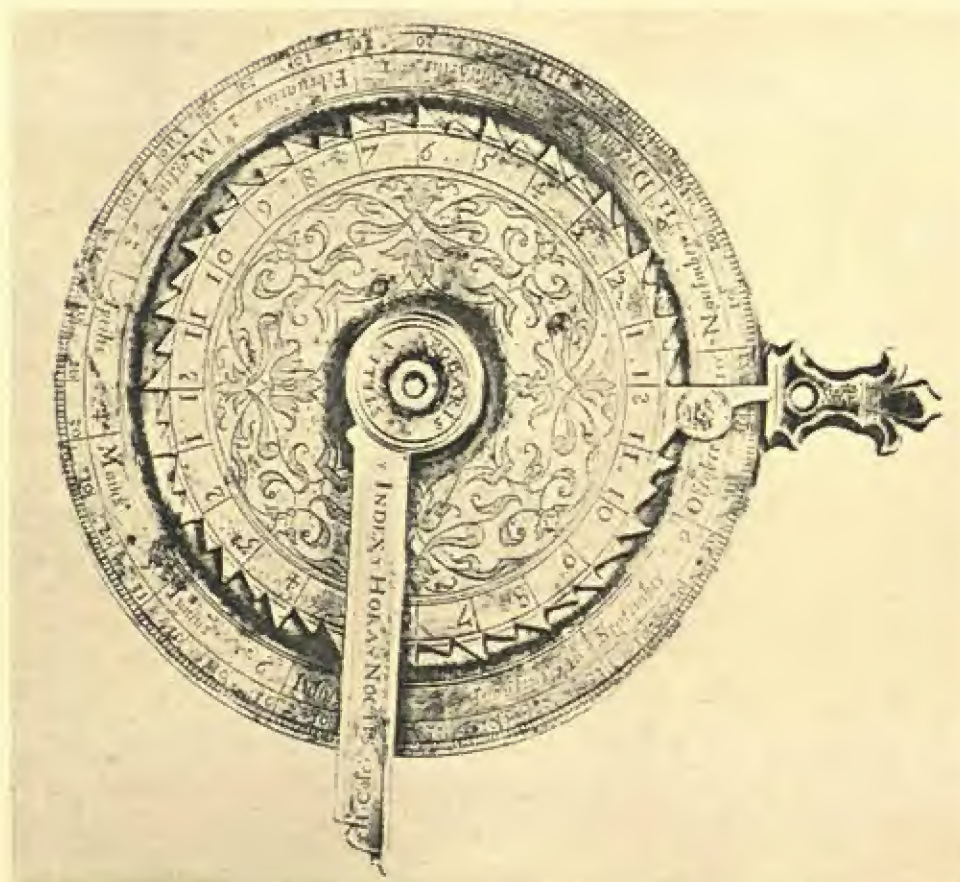


Fig. 36. NOCTURNAL

is marked with the symbols for Sextile *, Quadrine □, Trinall Δ, and Opposition ♄.

In the centre is a Tudor rose.

V. UNIVERSAL POCKET DIALS, 1575

Two examples are known; both are of gilt brass, $2\frac{1}{4}$ in. in diameter. One came to the British Museum with the O. Morgan Bequest in 1888 (figs. 34, 35). The other is in the National Museum of Antiquities of Scotland (fig. 33). They are signed *Humphrey Cole 1575*, but were possibly begun by him in 1572.

The watch-shaped dial-case is suspended by a ring attached to a small globular handle ornamented with chased strap-work, and supported by a pair of scrolls rising from a raised band which encircles the outer margin of the case. This band, ornamented as a wreath, comes between two engraved mottoes which also encircle the dial-case.

* AS TIME AND HOWRES PASITH AWAIE + SO DOETH THE LIFE OF MAN DECAY

* AS TIME CAN BE REDEMED WITH NO COSTE BESTOW IT WELL AND LET NO HOWR BE LOST

The first two lines were occasionally inscribed on church dials in the seventeenth century, perhaps indicating a wider usage at an early date. Dated examples are found on Blythburgh Church (1682), at Diptford in Devon (1694), and on a pillar dial at Wetherall, Cumberland, dated 1731.

In the example in the Scottish Museum the words are spelled somewhat differently, e.g. 'hovres paseth awaye', 'decaye', 'redeemed', 'cost', 'howre'. Also the spaces under the scrolls which support the handle are not perforated, but otherwise the two dials are identical.

On the bottom within a lightly engraved roll-and-bead border is a circular Calendar of Saints' Days. It resembles the calendar on Cole's ring-dial in all respects, save that it includes three additional days—St. Ambrose, St. Augustine, and St. Laurence—and that it omits the Dog days (fig. 35).

I. 1 Circū. 6 Epiph. 13 Hill. 25 Ca Pau.
 F. 2 Puri. Ma. 16 Valē. 25 Mat. Ap.
 M. 12 Grego. 25 Annū Ma.
 A. 4 Ambro. 23 George. 25 Marcus.
 M. 1 Phi. Iac. 6 Iō. Evā. 26 Augu.
 I. 11 Barn. 24 Iō. Ba. 29 Pr. Pa.
 I. Visi. Ma. 22 Ma. Mag. 25 Ia. Ap.
 A. 1 Pr. Vi. 10 Lau. 24 Bar. 29 De. Io.
 S. 8 Nat. Ma. 21 Mat. 29 Mjē.
 O. 13 Edwa. Cō. 18 Lu. 28 Sī. Iudi.
 N. 1 Om. Sā. 2 Om. Anī. 30 Andr.
 D. 6 Nī. 8 Cō. Ma. 21 Thō. 25 Na.

Within the calendar is a circular table of Dominical Letters, Leap Years, Primes and Epacts, inscribed

THIS TABLE BEGINETH AT 1572 & SO FOR EVER.

DO · LE ·	E D C B G etc.	} (pl. LXXI, fig. 35).
LE · Y ·	F A etc.	

PRI ·	15	16	17	18	19	1	2	3	4	·	·	·	} A table of Epacts belonging to the respective Primes or Golden Numbers, 1 to 19.
EPA ·	15	26	7	18	29	11	22	3	14	·	·	·	

The year 1572, it may be noted, was the last year in the cycle of years shown in a similar circular table in Digges's *Prognostication*, printed by T. Gemini in 1555, and recently reprinted as No. 3 of the Old Ashmolean Series of Reprints.

Inside the lid is a circular table of '*The latitudes of all the principall townes and cites of europe*', forty in number (fig. 34).

Edenboro	57° 0'	Parisius	47° 55'	Antwerpia	51° 28'	Francopho	50° 12'
Cōpostel	44 20	Marsilia	43 6	Bruxella	51 0	Cracouia	51 0
Lisbon*	39 38	Tolosa	43 30	Bruga	51 30	Dantisē	55 0
Barsal	41 35	Louani	50 58	Goudā	51 24	Lubecū	54 48
Nātes	48 12	Rone	49 0	Torāc	51 40	Emdē	53 42
Constanti	43 0	Douer	51 0	Northampe	52 50	W. Chester	53 10
Florentia	43 4	Exiter	51 0	Norwiche	52 30	Linckoll	53 15
Neapolis	41 0	London	51 34	Harford	52 50	Yorke	54
Venetia	44 50	Oxford	51 50	Leisetr	52 50	N. Cast	55
Roma	41 50	Bristo	51 0	Noting	53 0	Barwi	56 50

The lid of the dial-case, perforated with a central hole, is fitted for use as a Nocturnal. It is engraved with circles, the outer ones for signs of the zodiac and degrees, the inner ones for the corresponding months and days. Within are the rundle of '*The nighte howre*' with solar index, and a smaller rundle, marked '*The Pole Sterre*', with a long index.

The Compass card in the lower part of the case is of that beautiful Elizabethan design which appears to have been a representation of sixteen superimposed magnetic needles lying in the thirty-two directions of the points of the compass. Cole's card is hand-drawn and painted, and we find similar though printed cards in the later universal dials of James Kynuyn (1593), Charles Whitwell (1606), and of Elias Allen (c. 1610), in the Lewis Evans collection.

All the points are named in English. The north and south points are marked by the conventional fleur-de-lis and arrow, the east and west are marked by a cross and spearhead. In Cole's design a circular band separates the eight

primary points coloured red, from the eight intermediate points coloured green, and a second and larger concentric band separates the latter from the sixteen subsidiary points coloured blue (fig. 34). The circular brass band by which the tale cover of the compass box is held in position is engraved with the north- and south-pointing ends of a needle, evidently for marking the magnetic declination. This band has, however, been shifted from its original position.

On the same hinge as the lid is fitted a folding universal or equatorial sundial, which is supported by a brass semicircle. Pivoted on the ends of this is an hour circle, VI and VI at the pivots. At the meridian line towards the north a short bar projects inwards, and to this is hinged a gnomon piece shaped as a quadrant with the side away from the hinge prolonged. When this gnomon piece is opened square to the hour ring, its long edge is parallel to the polar axis, and if the instrument be set for latitude by the graduated edge of the quadrant and the semicircle arm stands upright, the dial is ready for use (fig. 33). A small hole at the centre of the quadrant indicates the former existence of a small plummet, now missing.

Several of the features of this dial have been repeated in a pocket dial made in 1593 by James Kynuyn for Robert Devereux, earl of Essex, and described by John Bruce in *Archaeologia* in 1867. Indeed, the arrangement of the inscription in two circles round the outer edge of the case, the calendar, the compass dial, and the lunar and tidal tables recall Cole's work so closely, that we must regard Kynuyn as his pupil. Kynuyn is known as the maker of Blagrave's Mathematical Jewell (1585) and Familiar Staff (1590), and his place of business, like that of Humphrey Cole, was 'neere Powles' in London.¹

VI. RING DIAL, 1575

Gilt brass. $2\frac{3}{8}$ in. in diameter and $\frac{3}{4}$ in. broad. Signed *H. Cole*. Dated 1575. Given to the British Museum by C. J. Wertheimer in 1905.

This fine ring-dial was designed for use in the latitudes of nineteen towns situate between the latitude of Louvain $50^{\circ} 58'$ and the latitude of Berwick, 56° ; all the towns except two, Louvain and Antwerp, are English, and their names are engraved in two circles round the ring (pl. LXVIII, fig. 14).

When adjusting for use, the pin-hole in one of the movable bands must be set for the day of the year and the latitude; the transverse groove on the inside of the ring is then placed upon the knife-edge of a suspension bar, which is attached by a bracket to the shackle and ring by which the ring-dial is

¹ *Archaeologia*, xl, p. 6.

suspended. The correct setting is effected with the aid of a diagram on the inside of the ring.

On the outside of the ring are seven circles inscribed with data for calendrical operations: four are on bands fixed to the main ring, and three are on movable bands alternating with the four fixed bands. The adjustable bands are for planetary aspects, for lunar days, and for setting the pin-hole with which the altitude of the sun is measured.

It will be noted that all the circles read from right to left.

1. Calendar.

6 Nico	8 Con. Ma	1 Omni San	13 Edward Con	8 Nati. Mari
21 Tho	25 Nat. Do.	2 Om. An.	18 Lvc	21 Mat.
		30 Andr	28 Si. Ivd	29 Mich
1 Pe. vin.	17 Dogen	6 Doge. begin	11 Barn	24 Io Bapt
24 Bart	29 Dec Io	22 Mag.	25 Ia Apo	1 Philli Iaco
			29 Peter Paul	6 Joan Evan
23 George		12 Gregori	2 Pvrifi Mari	1 Circv
25 Marcvs		25 Anvn. Mar	14 Vale.	6 Epiph
			24 Mat	13 Hile
				24 Cō. pā

2. Aspects on a movable band, with a crescentic boss for use as a handle.

SEXTILE * CONIUNCTION σ \mathcal{D} SEXTILE * QVADRINE \square
 TRINALL Δ OPPOSITION \wp TRINALL Δ QVADRINE \square

3. Zodiac Scale with the degrees, symbols, and initial letters of the twelve signs.

C	♈	S	♉	S	♊	L	♋	V	♌	L	♍
30 20 10		30 20 10		30 20 10		30 20 10		30 20 10		30 20 10	
C	♎	G	♏	T	♐	A	♑	P	♒	A	♓
30 20 10		20 20 10		30 20 10		30 20 10		30 20 10		30 20 10	

4. Lunar days on a movable band, with full moon boss for use as a handle.

29 28 27 26 25 24 23 6 5 4 3 2 1

5. Scale of Calendar months. March 11 corresponding to the first of Aries in the Zodiac scale.

31 20 10	D	30 20 10	N	31 20 10	O	30 20 10	S	31 20 10	A	31 20 10	I
30 20 10	I	31 20 10	M	30 20 10	A	31 20 10	M	29 20 10	F	31 20 10	I

6. Movable band with pinhole.

[Pinhole] 0 Douer 51.0 * Exiter 51.0 * London 51.34 * Oxforde 51.50 * Bristo 51.20 *
 Northampton 52.50 * Norwiche 52.30 * Harford 52.50 * Leiseter 52.50 * Notingane 53

7. Latitudes of towns continued on edge of ring.

West Chester 53.10 * Lincolne 53.15 * Yorke 54.0 * Newe Castell 55.0 * Barwick 56.0
 * Saulizburie 51.15 * Winchester 51.0 * Antwerpia 51.28 * Louanium 50.58 *

The occurrence of Salisbury and Winchester distinguishes this list from the similar list in Jugge's Portable Dial, p. 284, though the former town is included in Drake's Dial.

Inside the ring are:

1. An analemmatic scale marked with the signs of the zodiac and with lines for latitudes 50° to 56° for setting the pin-hole.
2. The oblique hour-lines usual in ring-dials.
3. A rectangular table of four columns headed 'M, D, So', and 'Si', the Days of the Months in which the Sun enters the twelve Signs, beside which is the maker's signature, 'H. Cole'.
4. Circular table corresponding to 'A table for the Sondaies Letter and Leape year' for an earlier cycle of years 1554-72 in Digges's *Prognostication* 1555.
5. Circular table marked '*G. Nube. Epact*', corresponding to 'A table for the Golden numbre or Prime: and also for the Epacte' from the same source. Both circular tables are inscribed, '*This Table Be||gineth at A. 1575 and so For Ever.*'

VII. NOCTURNAL

Cole's Nocturnal is undated. It was purchased for the British Museum in 1856 (plate LXXII, figs. 36, 37).

The circular base plate of gilt brass, $3\frac{3}{4}$ in. in diameter, is engraved with a circular scale of the days and months of the year. A short handle, ending in a simple fleur-de-lis, perforated for suspension, is marked with an owner's initials, 'W. F.'

The decoration is surface-engraving of the Dutch and Italian type of leaf-and-branch work common in many works of the period both in England and Germany, and familiar through the initial capital letters used in many printed books, including the works of Blundevile, 1613.

Rotatable on a central hollow pin is the hour rundle, with peripheral teeth like those of a circular saw, but alternately long and short to distinguish hours and half-hours by the sense of touch in the dark. A specially large tooth at the twelfth hour serves as the solar index for setting the hour rundle to the day of the month. On the same hollow axis is also the usual '*Index hora Noctis*', engraved with the words '*Stella Polaris*' round the central aperture, and with the maker's signature, *H. Cole*.

The mid-line of the handle corresponds to October 23 on the circular scale, a date intermediate between 28th October of Munster's Nocturnal, that was still usual in the common 'Nocturlabes' of Blundevile's time, and October 21 prescribed by him for greater accuracy. Our instrument was evidently designed for use with the fore-guard of the Little Bear. The manner of using has been already described by John Williams, F.S.A., in *Archaeologia*, vol. xl, and therefore need not be further treated here.

With this simple instrument a traveller could obtain the time at night to within a quarter of an hour. For greater precision, astronomers allow for the error due to the pole star's distance from the pole, a correction that was introduced by Coignet in his 'Rectifier of the North Star'.

The back of the base plate is an instrument for ascertaining the time of high-water at places of which the index point is known, as described on p. 287. On the plate are three concentric circles: (1) Circle of 360 degrees; (2) Circle of twenty-four hours, numbered 1-12, 1-12; (3) Circle of points of the compass marked ♣, NE, E, SE, S, SW, W, NW.

Inside these circles moves a 2-in. rundle with index tooth, engraved with a circle of 30 days, and over this is a 1½-in. rundle with lunar index and aperture to show the phases of the moon; it is engraved with a diagram of planetary aspects marked, ♄ Δ □ *, but the polygons have not been completed, a feature in which the instrument resembles the similar dial constructed by James Kynuyn in 1593.¹

The manner in which the three outer circles may be used is described by Digges in his *Prognostication* printed by T. Gemini in 1555. Digges considered it 'A perfecte Instrument for the day and the night'.

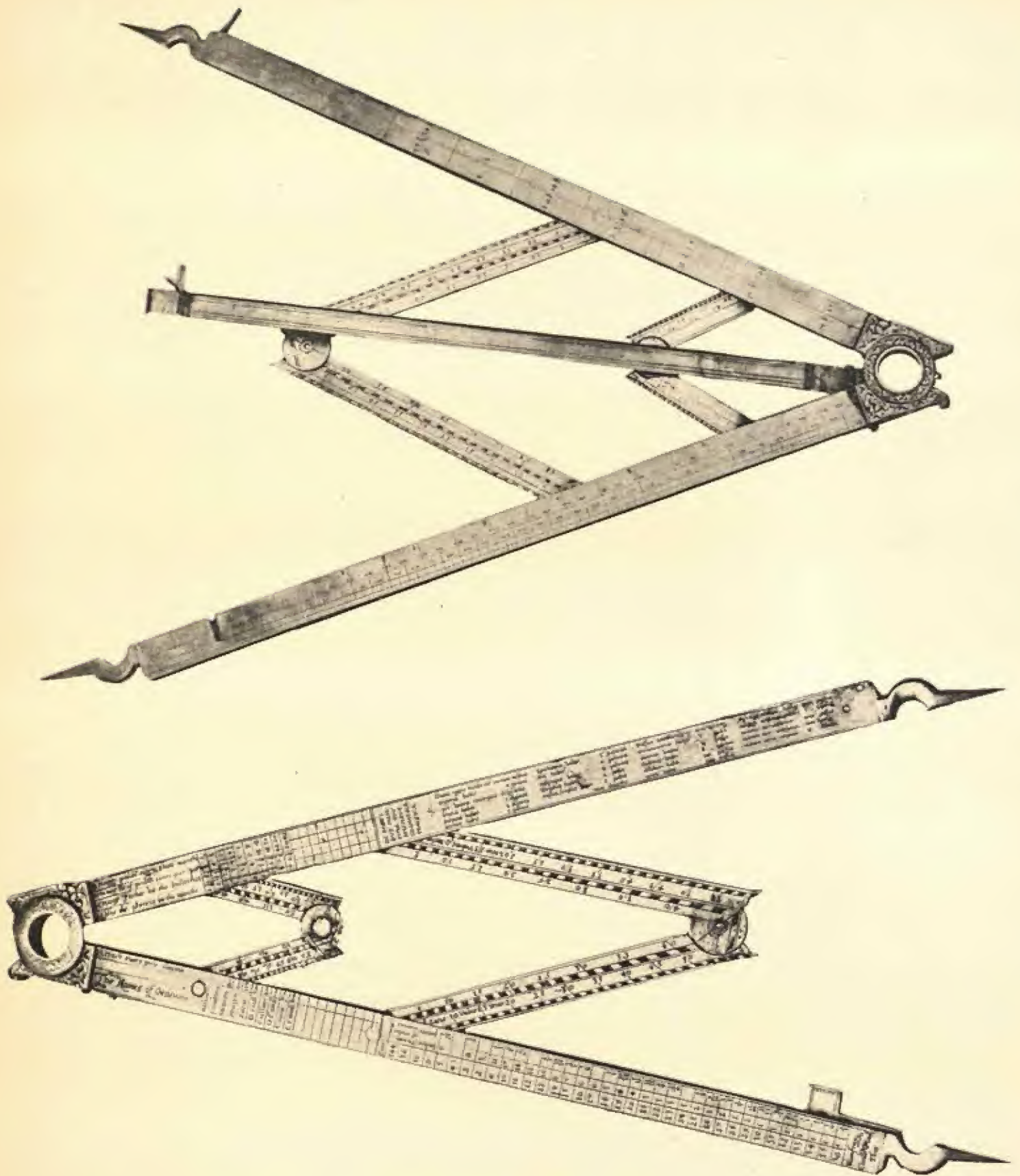
VIII. 12-INCH GUNNER'S COMBINATION COMPASSES

Signed 'Humfray Coolle Mad This'. No date. Length 12½ in. Given by Maj.-General Augustus Meyrick to the British Museum in 1878 (plate LXXIII).

When closed, the instrument resembles a large pair of compasses with flat rule-like limbs, opening by a highly ornamented joint with a large hole in the middle. Owing to the lack of some adjacent part of the instrument operated by a spring catch, the purpose of so large an aperture is not quite clear, but it may once have served to contain a small magnetic compass. One of the two limbs is furnished with two folding pin-hole sights (one broken) attached 10 in. apart to the outer edge of the limb. A third radial arm with a fiducial edge closes into a groove in the other limb, and it too was provided with folding hole-and-pin sights, one of which has been broken off. When not in use, the sights close into notches in the second limb of the instrument.

The instrument, which is inscribed with scales on all sides, may truly be described as an *Instrumentum Holometricum*, perhaps like that supplied by Cole to Martin Frobisher's expedition of 1576 at a cost of £4.

¹ Bruce, 'Description of a Pocket-Dial', *Archaeologia*, xl.



Figs. 38, 39. 12-INCH GUNNER'S COMBINATION COMPASSES

On the other side (fig. 38) are two scales:

(1) A scale of $9\frac{3}{4}$ in., each inch divided into 32 parts, in all 312 parts numbered by fours. (2) A scale of 10 in. inscribed with the following numbers:

36	6	$211\frac{2}{3}$	$18\frac{4}{5}$
16	4	23	16
9	3	$21\frac{1}{3}$	14
$59\frac{1}{2}$	$24\frac{4}{5}$	$17\frac{2}{3}$	$12\frac{2}{5}$
4	2	$14\frac{2}{3}$	$11\frac{1}{11}$

On the outer edges are scales of (1) *Tim[ber] Measure*, graduated 13 to 36 and marked in capitals 'SQUARE YNCES OF THE TYMBRE'. (2) '*Borde Measure*' graduated 13 to 36. Both scales have been suggested by the similar scales described by Digges as useful adjuncts to his Carpenter's Ruler.¹

The Geometrical Squares. When the limbs of the compass are fully opened out at right angles to one another, two folding bars open between them and form two geometrical squares, which are graduated on both sides with Scales of the Shadows inscribed *Latus Vmbrae Rectae* and *Latus Vmbrae Versae*. On the larger square these scales are divided into 60 and 45 on both sides. On the smaller square the numbering of the scales is continued past the joint 0-45 and 0-90, and 0-90 (figs. 38, 39).

IX. GUNNER'S COMBINATION COMPASSES, 1575

Signed *H. Cole* 1575. Purchased in 1912 for the British Museum (fig. 40 and plate LXXIV).

This ingeniously contrived instrument is shaped like a joint rule, $7\frac{3}{4}$ in. long, ending in compass points. The limbs are hollow for the reception of folding scales and four engraved tables, and all surfaces are engraved with scales on both sides. The edge is provided with two pin-hole sights $4\frac{1}{4}$ in. apart, which can be folded down when not in use. An inscription along the outer edge summarizes the uses of the instrument:

This Instrument is a rule, a square, a peare of Compafses, A quadrant to knowe y howres, heightes and distances of any thinge. y shotinge of Ordenaunce to measure.

*H. Cole * 1575. The haightes and waightes of Ordenaunce *.*

The front side is engraved with scales useful for gunners and for mensuration, and on the hinge a circular table shows the dates of '*The entraunce of y sone int. the 12 signes*' (fig. 40). Along the limbs are engraved gunners' scales:

¹ Digges, *Tectonicon* 1556 (f. 17 in the 1592 edition).

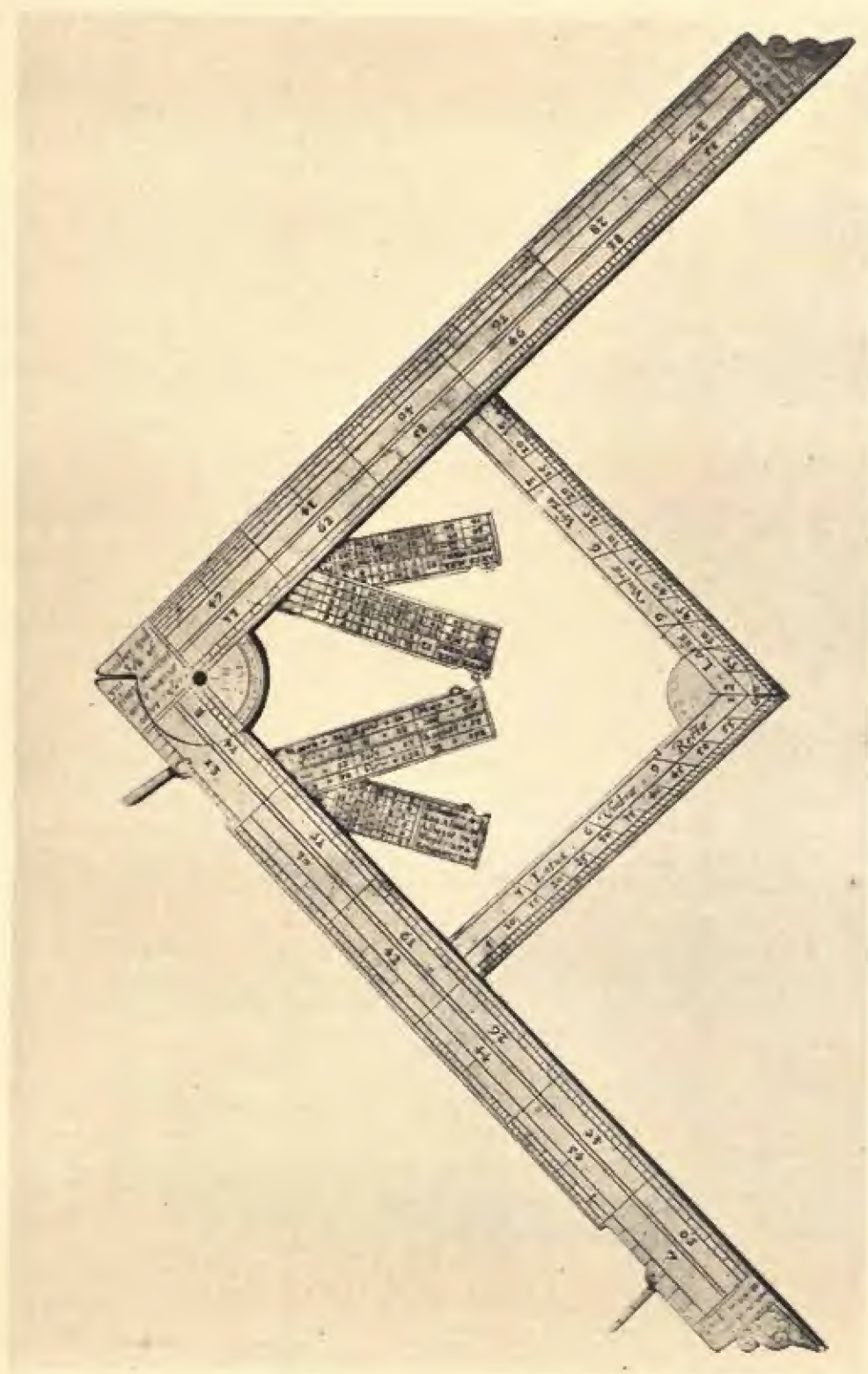


Fig. 41. GUNNER'S COMBINATION COMPASSES, 1575

Published by the Society of Antiquaries of London, 1927

Howe Maney pounce euery Shote wayeth	1	2	2½	4½	5	9	18	30	60	42	60
Maney scores at pointe blancke		14	16	17	18	20	25	28	20	20	21
Maney li of powder euery pece shot	½	2	2½	4½	5	9	18	28	44	20	60
Many Inches hye the bullet is	1	1½	2½	3	3½	4	5½	6½	7½	6½	8½
Hie ½ pece is in the mouthe	1½	2	2½	3½	3½	4½	5½	6½	8	7	8½
Moche euery pece wayethe	200	500	800	1100	1500	3000	4000	6000	7000	8000	9000
The Names of Ordenaunce	Robin ^t	Falcon ^t	Fawcō	Mynio	Sacar	D'Cull	Cull	D'Cañ	Canon	E. Cañ	Bazilis

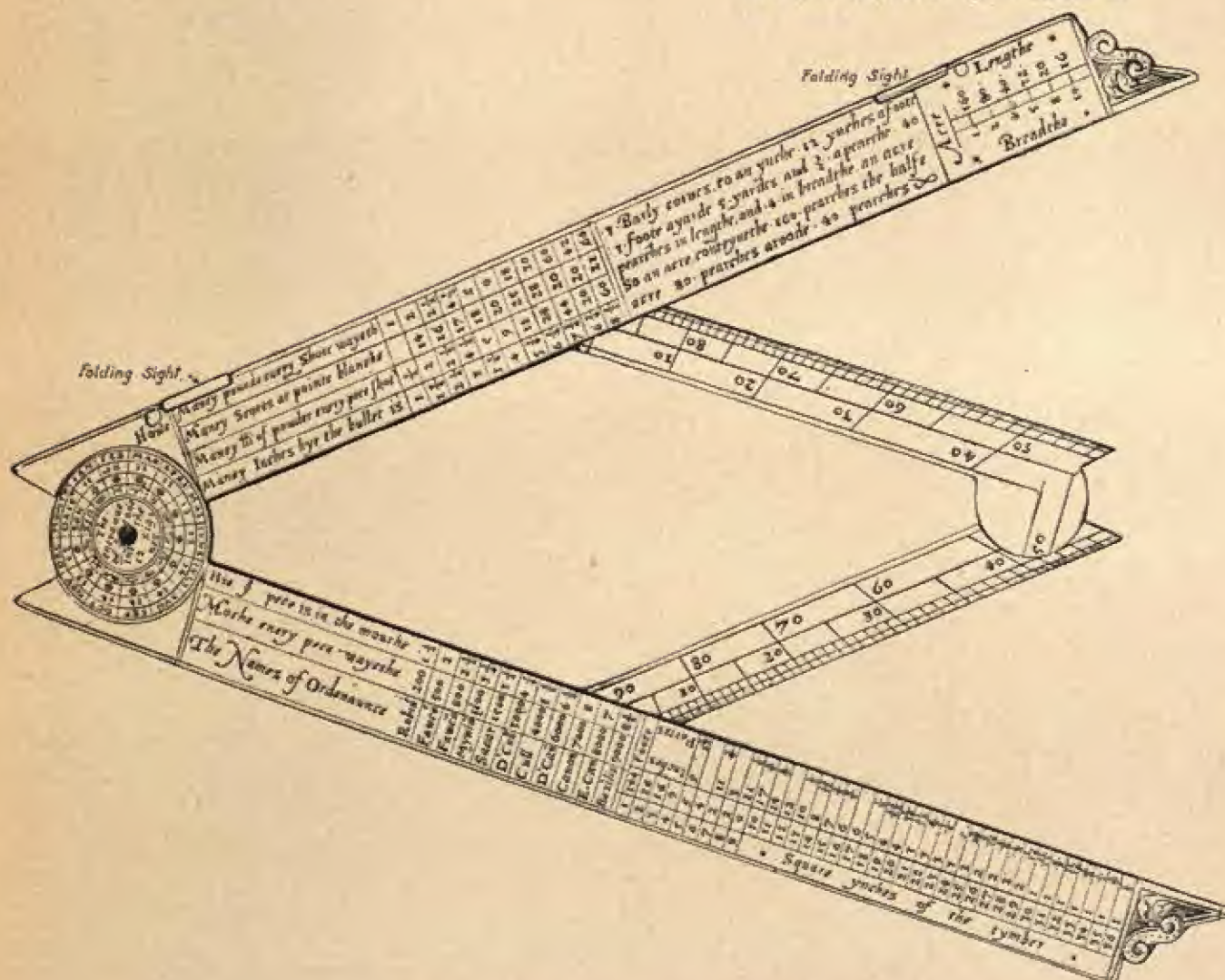


Fig. 40. Gunner's Combination Compasses. 1575-

Then follow tables that have evidently been taken from Digges's *Tectonicon*, in which one appears as 'The Table of Timber Measure with the declaration and vse of it'. An Acre Table is given in the same work on sig. B.

3	Barly	cornes	to	an	ynche.	12	ynches	a	foote																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					</
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On the back (fig. 41) are 6-in. scales of '*Timber and ynches of platt measure with manye other vses **'; and also scales of twenty-four single inches divided into the following numbers of equal parts:

	27	28	36	40	24	64
	51	48	46	58	62	33
and	34	35	39	26	45	50
	13	30	42	44	54	7

Near the end of one limb are notes of the positions of four stars:

Arctur ⁹	11	II	20
Aquila	19	Y	29
Pleyad ⁹	7	⊗	50
?Orioni hu	15	Y	109

The angle of separation of the limbs may be read on the hinge on a small quadrantal scale divided into 90°. When completely opened out, a folding quadrate is also fully spread. On one side it is engraved with degrees in both directions, and on the other with scales of the shadows, inscribed *Latus Vmbræ Rectæ* and *Latus Vmbræ Versæ*, and divided into the usual divisions numbered 3, 6, 9, 12, 9, 6, 3, and also by fives from 0 to 60 to 0; and on the other side by tens numbered 0 to 90 in both directions. When the instrument is closed the two folding sides of the quadrate shut into the limbs, like blades of a knife.

Within the quadrate are hinged four small leaves of gilt brass, two closing into each limb of the instrument. Each leaf ends in a small perforated lug, probably to help in opening, and is engraved with tables on both sides. Two tables state the days of the month when the sun enters the twelve signs. Six

tables give the height of the sun above the horizon thrice in every month and for every hour of the day (fig. 41).

On one leaf are engraved the right ascensions of five stars.

L.	ANTE	MER	} 12 {	11	10	9	8	7	6		
	POST	MERI		1	2	3	4	5	6		
	☾	☿		38:	36:	32:	26:	18:	9:	0	
	20	10		34:	33:	28:	22:	14:	6:	0	
	10	20		30:	29:	25:	19:	11:	3	0	
L.	ANTE	MER	} 12 {	11	10	9	8	7	6	5	4
	POST	MERI		1	2	3	4	5	6	7	8
	☾	☿		50	48	43	35	27	18	8	0
	20	10		46	44	39	32	24	15	6	0
	10	20		42	40	36	29	21	12	3	0
L.	ANTE	MER	} 12 {	11	10	9	8	7	6	5	4
	POST	MERI		1	2	3	4	5	6	7	8
	☿	☿		58:	56:	50	43:	34	24	15	6
	20	10		56:	54:	48	41:	32:	23:	13	4
	10	20		53:	51:	46	38:	30	20	11	2
L.	ANTE	MERI	} 12 {	11	10	9	8	7	6	5	4
	POST	MERI		1	2	3	4	5	6	7	8
	☿	☿		62	59	53	45	36	27	18	9
	20	10		61	59	53	45	36	27	17	9
	10	20		60	58	52	44	35	26	17	8
R.	ANTE	MER	} 12 {	11	10	9	8				
	POST	MERI		1	2	3	4				
	☿	☿		18	17	13	8	1			
	20	10		16	14	11	6	0			
	10	20		15	14	10	5	0			
	☿	30		15	13	10	5	0			
R.	ANTE	MERI	} 12 {	11	10	9	8	7			
	POST	MERI		1	2	3	4	5			
	☿	☿		27	25	21	15	8			
	20	10		23	22	18	13	5			
	10	20		20	19	15	10	3			

Scheder 4½
Ras Algol 41
Alhayor 71½
Wega 274
Benanaz 203

[Three
columns
blank]

The signs after the numerals have not been reproduced in this table: they probably indicate fractions as in Digges's works, where : stands for $+\frac{1}{2}$, and · stands for $-\frac{1}{2}$.

R.	March	*	10	April	*	10	May	*	11
	☾		0	☿		28	☿		57
	June		12	July		13	August		13
	☿		90	☿		122	☿		152
R.	Septem		13	October		13	Nouemb		12
	☿		180	☿		207	☿		37
	Decemb		11	Januari		9	Februari		8
	☿		270	☿		302	☿		332

X. HORIZONTAL GARDEN DIAL, 1579

Base 7 in. square.

Lewis Evans collection.

Made and signed by 'H. Cole 1579' for 'Sir Henry darcy', who had been dubbed a knight in 1566 at Fotheringhay by the earl of Leicester.¹

The gnomon is for latitude 51° . The base is also engraved with the name 'H. Kaye'.

XI. ARMILLARY SPHERE, 1582

Inscribed *Humphrey Cole fecit 1582*. Height $17\frac{3}{4}$ in. Part of the ancient scientific equipment of the University of St. Andrews (plates LXXV and LXXVI).

A special feature of this instrument is that it is fitted with an alidade with large and small pin-hole sights, which can be rotated upon a circular disc of $10\frac{1}{2}$ in. diameter, for the ready measurement of altitudes when the disc is in a vertical position, or of azimuths when it is set in a horizontal plane. For the sake of strength this plate is built up of a lamina of brass, stiffened at the back by being riveted to a peripheral brass ring. The introduction of such a rotatable plate within an armillary sphere was no new idea: its uses had already been described by Cortes in his *Breve compendio de la Sphera y de la arte de Navegar*, published in 1545. It is engraved with an orthographic projection of the celestial sphere,² and can be rotated on the polar axis between the 'Polus Arcticus' and the 'Polus Antarcticus', the former being $4\frac{1}{2}^{\circ}$ distant from the 'Stella Polaris'. At $23\frac{1}{2}^{\circ}$ distance are marked 'Poli Zodiaci' connected by a diametric line crossing the 'Linea Æcliptica' at right angles.

Around are meridian and equatorial circles rigidly fixed to each other. The former is graduated in degrees from 0° to 90° in each quadrant. The latter is graduated in hours and degrees VI 0° , XII 90° , VI 180° , XII 270° , VI 360° . Further rigidity is ensured by the rotatable plate and the meridian circle being provided with lugs which embrace the equatorial circle and the legs of the circle, respectively.

The equatorial circle is supported on trunnions in a horizontal circle, graduated with 32 points of the compass and a circle of degrees, 360° at the North. The rim of this circle is expanded into four semicircular brackets, two of which are slotted in such a manner as to suggest that the maker had changed

¹ Metcalfe, *Book of Knights*.

² Some of the uses of the orthographic projection are given in Stone's edition of Cunn's *Treatise of the Sector*, 1729.



Fig. 42. COLE'S ARMILLARY SPHERE, 1582
(*St. Andrews University*)

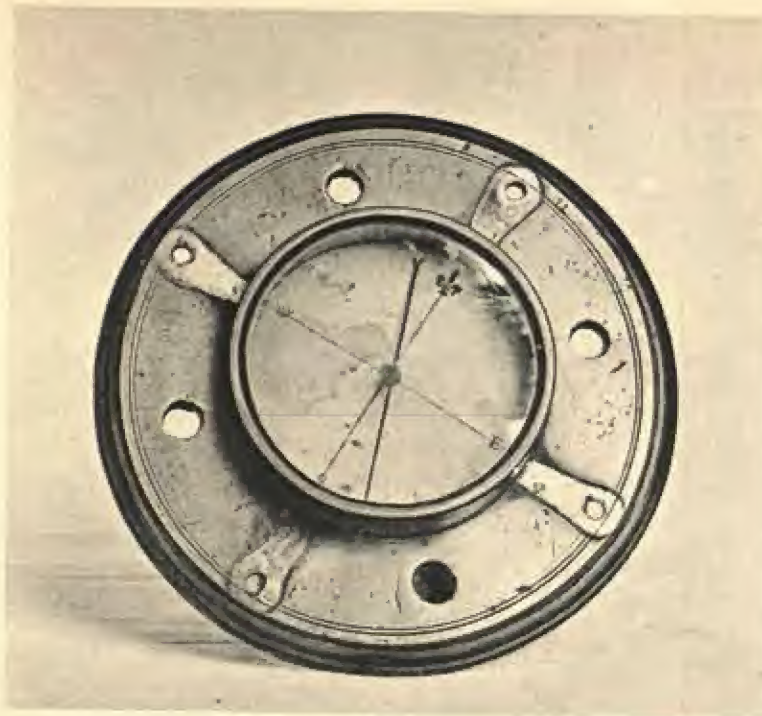


Fig. 43. Magnetic Compass on the Base-Plate

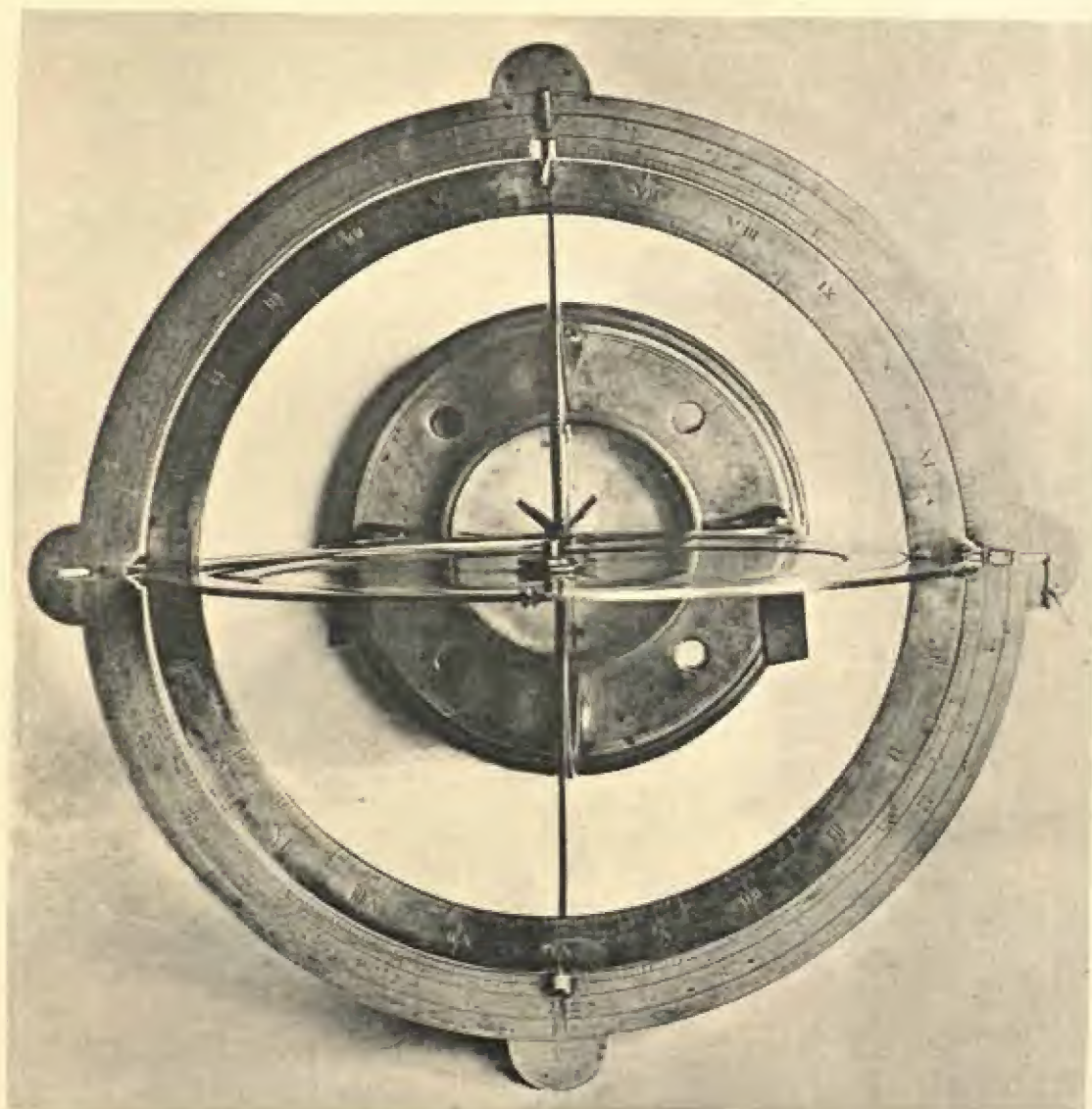


Fig. 44. Top View

COLE'S ARMILLARY SPHERE, 1582

Published by the Society of Antiquaries of London, 1927

his design during the course of the construction of the instrument. The circle is carried on four legs meeting above four others, between which was a small plummet (now missing) and a 5-in. magnetic compass, with simple card and original Y-shaped needle.

The inner rim of the compass-box is graduated to 2 degrees all round numbered 0° to 90° to 0° to 90° to 0° .

The instrument is screwed to a substantial base plate, $8\frac{1}{2}$ in. in diameter, perforated in four places, apparently for secure fixing, perhaps on board ship.

XII. THEODOLITE, 1586

Signed *H. + Cole + 1586*. Deposited with the Lewis Evans Collection by St. John's College (figs. 45-47).

This extraordinarily interesting instrument is the latest work of Cole and the oldest theodolite hitherto described. It was found behind a box in the Library of St. John's College in Oxford by my friend Mr. Last when acting as temporary librarian. It is incomplete, the basal alidade and horizontal circle being missing; but as the vertical semicircle, bearing the maker's inscription, sighter, and plummet, the most important parts, are extant, there is no difficulty about the reconstruction of the remainder. The compass-box belonging to the instrument was discovered later, and was most fortunately saved from destruction with other so-called rubbish in a cellar in which the Poynter collection of objects of natural history was stored. It is quite possible that the instrument came to St. John's from Archbishop Laud with other instruments, one of which was an astrolabe by Hartmann.

The diopter or sighter is a square bar 9 in. in length and $\frac{7}{16}$ in. thick, with sights at the extreme ends. The sight-vanes are of an unusual pattern, being furnished with right and left brackets at the top. In addition, the near vane is perforated with a pinhole, and the foresight has a central bead exactly like the foresight of a modern rifle—a type of sight of which it may be the first known example. The sighter is fixed to the diameter of the vertical semicircle, $4\frac{7}{8}$ in. in diameter, the rim of which is graduated into degrees.

Inside are scales of *Vmbra recta* and *Vmbra versa*, $2\frac{1}{8}$ in. across, graduated 3-6-9-12-9-6-3. The semicircle or clinometer turns on an axis by which it may be clamped in any desired position. The supporting legs are mounted on an arch carrying a small metal plummet over a compass-box. The compass-box is fitted with two lugs and thumb-screws for fixing it to a horizontal alidade (now missing) which traversed the horizontal circle. The two latter details have been restored.

By such a restoration we have a surveying instrument that was undoubtedly based upon the 'Instrument topographically' described by Thomas Digges in 1571. But it comprises two valuable instruments in addition—the compass and the plummet. It may therefore claim to be the oldest Theodolite, using the word in its modern sense, in the world.

XIII. CIRCULAR ASTROLOGICAL CALENDAR

[Note added 17 June 1927]

The publication of Cole's great Astrolabe in the *Illustrated London News* for August 14, 1926 has been followed by the identification of another instrument as his work, although it does not actually bear his signature or a date. It was exhibited by Mr. G. H. Gabb at a conversazione of the Royal Society held on May 11, 1927, and photographs were published in the *Illustrated London News* three days later. Mr. Gabb describes it as an Elizabethan 'Planisphere'. There is, however, nothing of a planisphere about it. It consists of a disc measuring $13\frac{7}{8}$ in. in diameter to which a circular rim has been fixed by some twenty rivets, and which can be suspended by a ring and swivel attached to an elaborately chased scroll-bracket. The flat side is engraved with a series of circular calendar scales struck from one centre and surrounding rectangular shadow scales of *Umbrae rectae* and *Umbrae versae* in a semicircle below the arms of Queen Elizabeth with the initial letters E R, the Garter and motto 'Hony soyt quy mal y pense', the portcullis and the Tudor rose.

On the other side a raised rim is divided as a circle of 360 degrees, and the part within, which had probably been left plain by the original maker, was engraved in 1655 by Henry Sutton with a logarithmic scale in a spiral.

The Calendar scales are disposed in fourteen circles, as follows: 1. A circle of degrees numbered quadrantly from 0° to 90° ; and also as 2, a circle of degrees numbered 0 to 30 in each of the twelve signs of the Zodiac, whose names and symbols are stated in circle 3. 4. A circle of the days of the months, March 9 corresponding to the 1st of Aries. 5. A circle of 28 lunar mansions, beginning on March $30\frac{1}{2}$. Their characters are inscribed according to the scheme of the *Epitome Astrologiae* of Johannes Hispalensis.

1. Temperata infortunata. 2. Mansio ☿ sicca fortuna. 3. Temperata fortunata. 4. Hum. multum infort. 5. Mansio ☿ sicca infort. 6. Temperata rorida fortunata. 7. Humid. infortunata. 8. Temperata fortunata. 9. Sicca fortunata. 10. Mansio ☿ hum. fortunata. 11. Temperata infortunata. 12. Hum. multum fort. 13. Temperata fortunata. 14. Temperata rorida fortun. 15. Humida infort. 16. Mansi. humi. multum infort. 17. Humida multum infort. 18. Sicca fortunata. 19. Humida infortunata. 20. Mansio ☿ humida fortun. 21. Temperata fortun. 22. Hum. multum fort. 23. Temperata fortunata. 24. Temperata rorida fortun. 25. Mansio sicca infort. 26. Sicca fortunata. 27. Hum. multum infort. 28. Temperata infortunata.



Fig. 45. The Compass box with lugs and the plummet.



Fig. 46. The Semicircle and Quadrate.

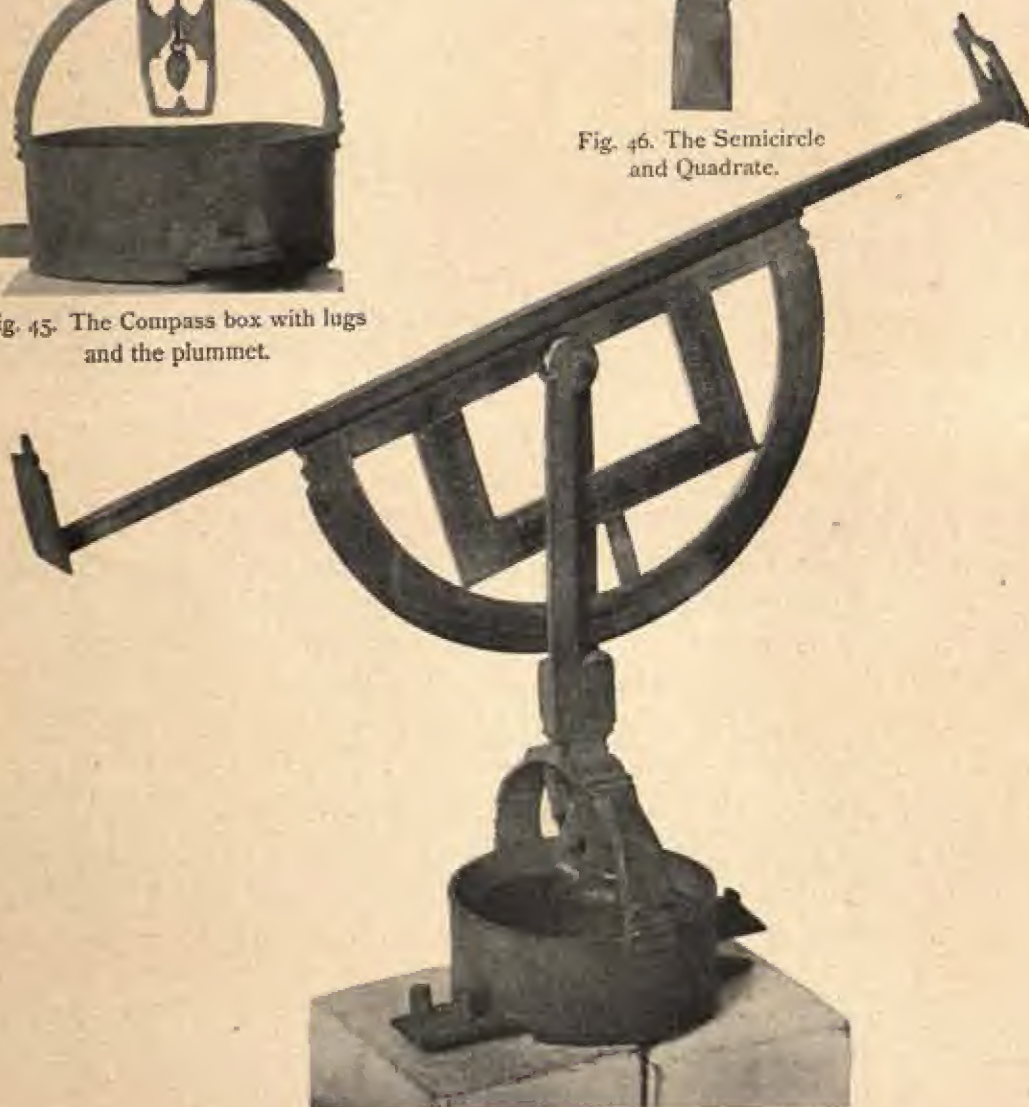


Fig. 47

Figs. 45-7. COLE'S THEODOLITE OF 1586.

6-14. The nine inner circles are filled with planetary symbols and astrological terms, grouped in twelve segments corresponding to the twelve signs, thus:

2.		5	10	15	20	25	30		
3.		Cancer, ☊							
4.	20	15	10	5	30	25	20	15	10
		Iulius				Iunius			
5.		8 Temperata fortunata			7 Humid infortunata			6 Temperata	
6.		casus ☊				a	p	faaaaa	fff
		p	p	p	p				
7.	Tenebrosi	Vac	Lucidi		Vac	te		Lucidi	Vac
8.		masculini	fem		masculini	fe	m	femin	m
9.		3 ☾			2 ☿		1 facies decanus ☿		
10.		h	♂		♄		♀	Term ♂	
11.		4 G aquei trigoni cuius primi dni die ♂ nocte ☿ 2 d ☿ nocte ♂. 3. die ♂ nocte ☾							
12.		Exaltatio ♂							
13.		Occasus h			Domus ☾				
14.		h	♂	♀	☉	♀	d	♂	

NOTES ON THE LIFE AND WORK OF COLE

The year of Cole's birth is not known, but it is possible to make a guess at the decade. About the year 1590 the poet, Gideon Harvey, referred to him as 'old Cole'. If we assume that he was then about seventy years of age, he would have been born about 1520. Again, in a letter which Cole wrote to Lord Burghley in December 1578, he wrote 'in this my olde age', an expression which he would have been most unlikely to have used had he been much under fifty-eight. His birth year may therefore be sought round about 1520.

According to his description of himself on the Map of the Holy Land, he was a north countryman, and by inference his familiarity with a copper mine 'in the ground of Mr. Robert Bowes of Aske in the Countie of Richemonde' suggests that he may have been a Yorkshireman.

A good idea of his performance as an instrument-maker is conveyed by the following list, which also seems to show that variations in the spelling of his name occur more frequently in his earlier work than in that of his later period.

		Presumed	
Suggested date of birth of Humphrey Cole.		1520	age.
V. C.	Universal Dial (Bodleian)	1554	34
V. C.	" " (Mensing collection)	1557	37
HUMFRAY COOLLE	Gunner's Combination Compasses (British Museum)	n. d.	
HUMFRAY COOLE	Jugge's Pocket Dial (Oxford)	1568	48
HUMFRAY COLLE	Drake's Pocket Dial (Greenwich)	1569	49
HUMFRAY COLE	Engraved Map for Jugge's Bible	1572	52
HUMFREY COLE	Prince Henry's Astrolabe (B.M.)	1574	54
H. CÔLE	Ring Dial (B.M.)	1575	55
HUMPHREY COLE	Universal Pocket Dials (B.M. and Edinburgh)	1575	"
HUMFRIDUS COLE	Great Astrolabe (St. Andrews)	1575	"
H. COLE	Gunner's Combination Compasses (B.M.)	1575	"
	Frobisher's Instruments (see p. 315)	1576	56
H. COLE	Nocturnal (B.M.)	n. d.	
H. COLE	Darcy's Horizontal Dial (Oxford)	1579	59
HUMPHREY COLE	Armillary Sphere (St. Andrews)	1582	62
H. COLE	Theodolite (Oxford)	1586	66
HUMPHREY COLE	died	1591	71

COLE AS AN ENGRAVER

An honourable place has already been awarded to Cole, as an engraver, by the inclusion of his name in the *Dictionary of National Biography*. The first person to recognize his outstanding merit was Horace Walpole,¹ and apparently



FIG. 48. Cartouche from Cole's Map of the Holy Land (see Fig. 50).

on the inadequate evidence of a single map. But this map was of sufficient merit to cause that excellent judge of engraving to attribute portraits of Queen Elizabeth, of Leicester, and of Lord Burghley to its author, who probably made no pretence to being a skilled portraitist. Now, the higher criticism of Sir Sidney Colvin attributes the portraits, with more probability, to Francis Hogenberg. Still, the fact remains that to Humphrey Cole, an instrument-

¹ Walpole, *Anecdotes of Painting*, iii.

maker, the credit is due of having been the first man in England to apply the art of line engraving on copper to geographical purposes.

Nor was he long alone in this art. His young contemporary, Charolus Whitwell, also a master of the craft, and several of whose instruments made between 1593 and 1606 are still extant, engraved one of the first maps of Surrey.

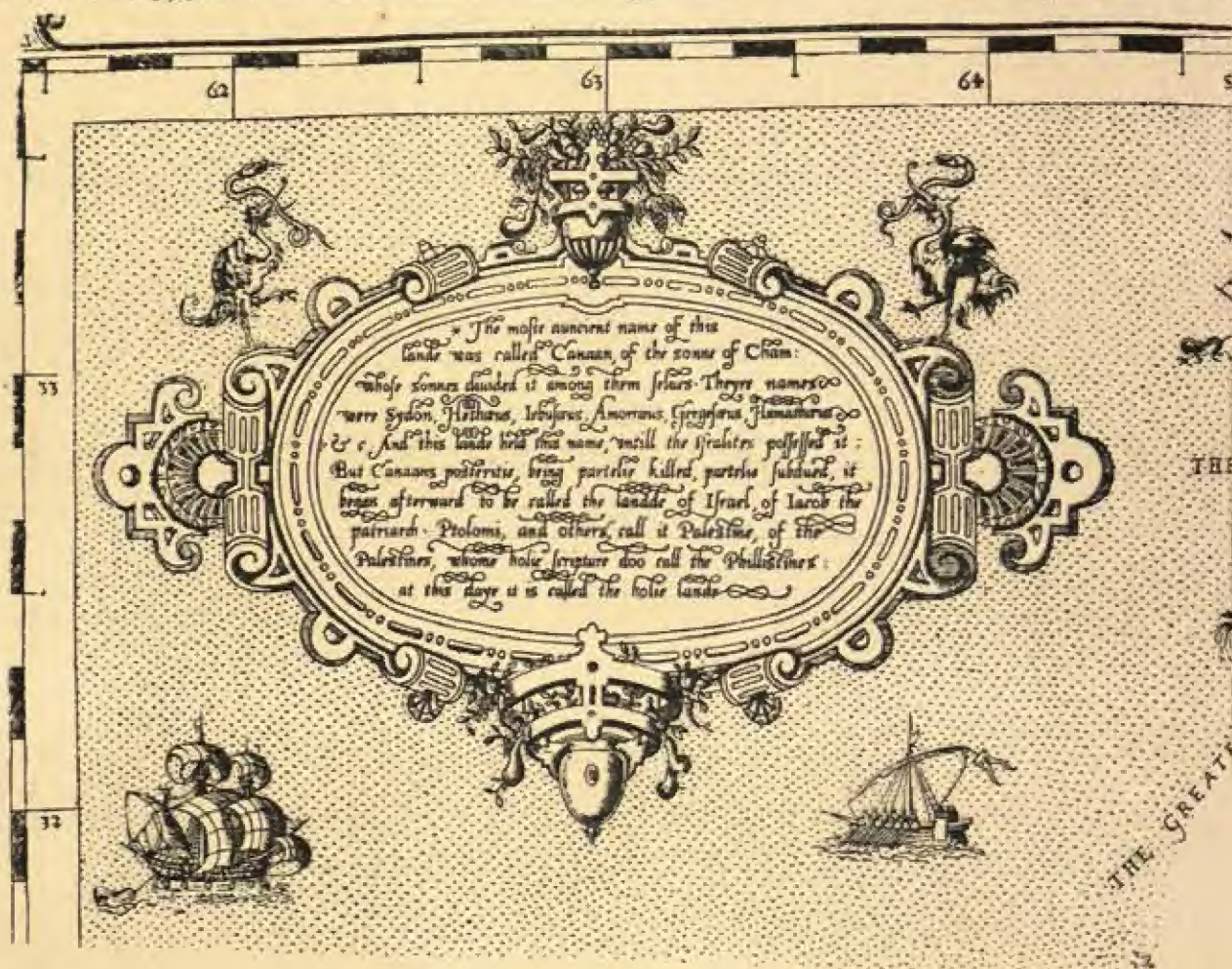


Fig. 49. Title to Cole's Map of The Holy Land, 1572.
(From the copy of Jugge's Bible in New College Library).

It is interesting to note that both at home and abroad the practice of illustrating books with copper-plate engravings of maps was due to the scientific-instrument maker. The older illustrators of the fifteenth and early sixteenth century, like Sebastian Munster, made use of wood-cuts for this purpose, but Gerard Mercator, realizing the greater advantages of the new art, took lessons in metal engraving from Gemma Frisius, Professor of Mathesis at Louvain, whose nephew Walter Arsenius made the only other known astrolabe which is in the same class as Cole's masterpiece, viz. the one made in 1566 for Philip II of Spain.

In 1554 Mercator produced his engraved map of Europe, followed ten years later by a map of the British Islands, and in 1569 by his great map of the world.

Meanwhile Humphrey Cole, who already had a good reputation as a maker and engraver of scientific instruments in metal, was employed by Richard

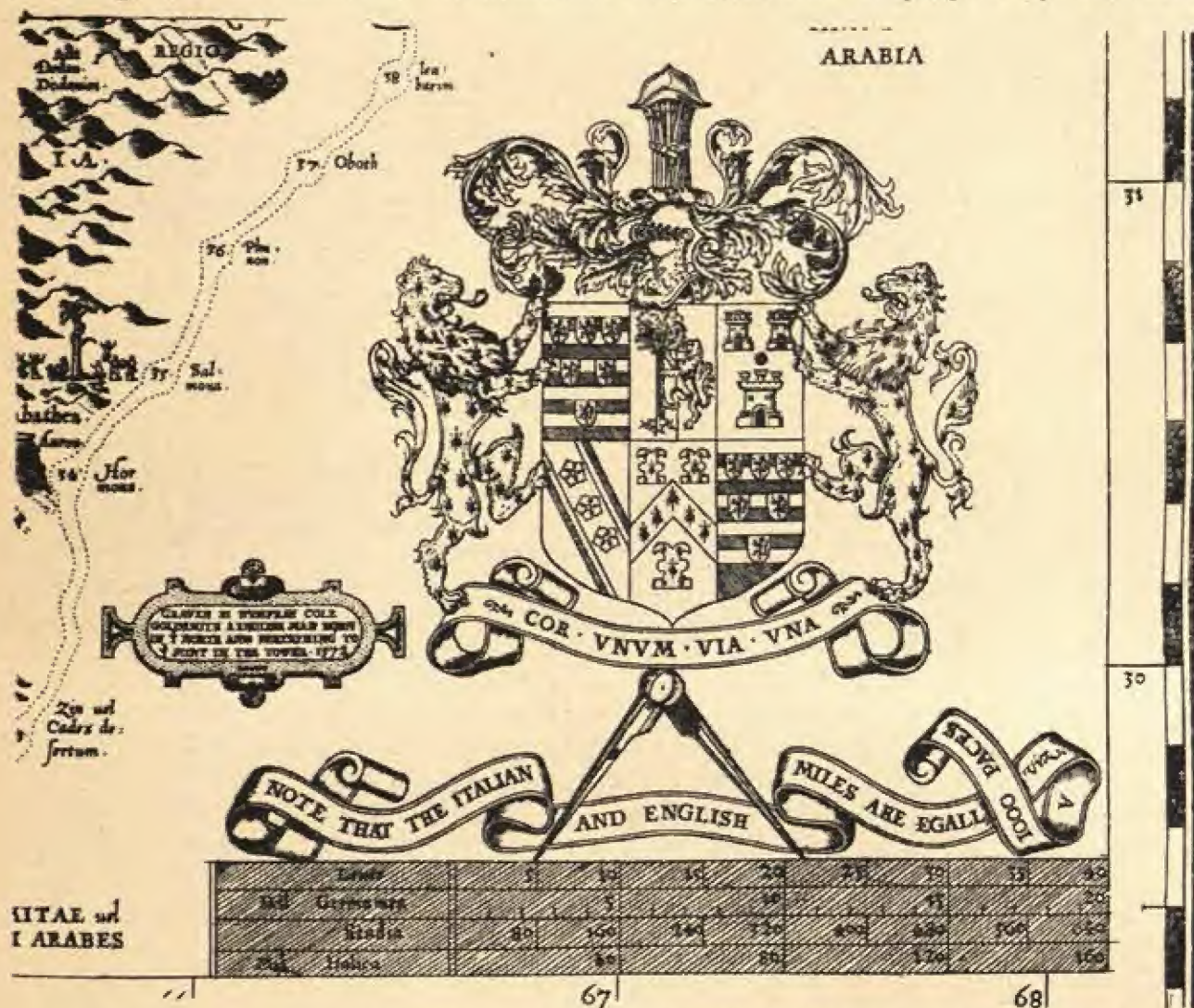


Fig. 50. The Arms of Lord Burghley, to whom Cole's Map of the Holy Land was dedicated in 1572.

Jugge (1547-77), the leading printer and publisher of Bibles, whose place of business was at the 'Bible' near the north door of St. Paul's, to extra-illustrate the 1572 edition of the Bishops' Bible with a double-page map of the Holy Land, done by the new process. Cole entered into the spirit of the work *con amore*. On completing the map, he added a long geographical inscription embellished with flourishes in a large oval compartment bordered by strap-work; he enriched another corner with the arms and motto of Burghley (fig. 50), whose portrait had appeared in the Bible of 1568, and with the canting badge of

Jugge; he occupied waste spaces of the Mediterranean with ships and whales; and he found room for a cartouche (fig. 48) describing his own share in the work.

In most particulars this map, dated 1579, appeared again in the *Theatrum Orbis Terrarum* of Ortelius,¹ entitled *Palestinae sive totius Terrae promissionis nova descriptio auctore Tilemanno Stella Sigeneus*. The badge of Richard Jugge is supplanted by an outline sketch of a magnetic compass. It would be interesting to ascertain whether the Ortelian map was copied from Cole's map or whether both were derived independently from the same original. Stella was a distinguished mathematician who is said to have published maps of Wittenberg in 1560.

For the elucidation of Cole's earlier associations, the engraved covers of



Fig. 51. The Badges of Richard Jugge.
 From 'The seconde part of the Byble' 1575. From 'The Calendar of Scripture', 1577.
 After McKerrow *Printers' Devices*, nos. 181, 182.

his Pocket Dials are of first-rate importance. The badge of the singing nightingale upon the Dial in the Lewis Evans collection proves that he was working with or for Richard Jugge in 1568. By the kindness of Mr. McKerrow we are able to illustrate examples of the same badge from two title-pages of Jugge's publications (fig. 51). Cole also appears to have worked with or for the leading man of science of that day, Leonard Digges, or with his publisher, Thomas Gemini, at a rather earlier date. It was thus, we suggest, that Cole acquired much of the scientific knowledge needful for the making of his instruments, and his skill in designing and engraving. The connexion with Jugge is proved beyond doubt: it remains to indicate the links with Digges and Gemini. The evidence is partly artistic, partly scientific.

It must be remembered that at the time of which we are writing, the art of copper-plate engraving in England was in its infancy. Setting aside the two engravings used to illustrate a work on the *Byrth of Mankind*, published by Thomas Raynold in 1540 and 1545, the first copper-plate illustrations printed in England were those of Thomas Gemini, a Flemish physician who had settled in London.

¹ The older maps in this Atlas were engraved by Francis Hogenberg of Antwerp c. 1570. The Map of Palestine was reproduced on a reduced scale in 1598 in Maginus' edition of Ptolemy's *Geography*.

They were copied from the famous woodcuts of Vesalius, and were printed in 1545 in the *Compendiosa totius Anatomie delineatio aere exarata*, which was further embellished by an engraved title, a workmanlike piece of work with the royal arms in the middle.

In 1555 and 1556 Gemini was established as a printer in Black Friars, where he printed two books for Leonard Digges: *Prognostication of Right Good Effect*, 1555, and *A Booke named Tectonicon* 'briefly shewynge the exacte measuryng, and speady reckonings all manner Lande, squared Tymber, Stone, &c. Published by Leonard Dygges Gentleman in the yere of our Lorde 1556. Imprynted at London by Thomas Gemini, dwelling with the Blacke Friers; who is there ready exactly to make all the Instruments apperteyninge to this Booke.'

It has already been shown that the Tables and other essential details printed in Digges's *Prognostication* of 1555 appeared almost contemporaneously in instrumental form in 1554¹ in an instrument signed by the maker, V.C. This instrument does in fact answer in part to Gemini's advertisement of 'all the instruments apperteyninge to this booke exactly made'. The simple inference is that V.C. was in the closest touch either with Digges, or with Gemini. It is inconceivable that Thomas Gemini, in addition to all his other work, could design and make such instruments himself. We suggest that Bagford was mistaken in believing him to be a 'man that could turne himself to anye mecanek work as ma be sene that he then made Mathematicall Instrumentes for Leonard Digges'. We have no evidence that he did. V.C. made such instruments, and V.C. may have been in the employ of Gemini, who, like a modern publisher, would have employed printers and 'artificial' workmen.

Fourteen years later we find Humphrey Cole, then in the service of the Mint and undertaking commissions for Richard Jugge, producing portable dials which, but for modifications in detail and decoration, were V.C.'s dials in improved form, exhibiting a more complete mastery of the craft of engraving. Like V.C., Humphrey Cole was a maker of the instruments of Leonard Digges. Indeed, he continued to make them for at least sixteen years after Digges' death. On the other hand, though we know of Thomas Gemini as a printer and as an engraver, we have no first-hand knowledge of him in the alleged capacity of instrument-maker, unless indeed as a printer of quadrants on paper concerning which Digges wrote, 'If ye lyst not to make a Quadrante, ye may use this (i. e. a printed woodcut) very wel: adding a plumbnet and lyne, with sightes or otherwise'. This, and the command of workmen, might have justified his adopting the title of instrument-maker.

If we make a detailed comparison between the decorative details of work attributed to Gemini and that of Cole, we find striking resemblances

¹ Gunther, *loc. cit.*, ii, p. 279.

between the second portrait of Queen Elizabeth, signed 'Thomas II 156-', and Cole's work. The lettering of the inscriptions and the cartouches and the ribbons might be by Cole. The decorative heads on the border suggest those on his Greenwich dial, 1569. And while in the Gemini title-page of 1545 with the royal arms there is nothing to suggest Cole's touch, yet on the reworked plate with the portrait of Elizabeth, the foliated ornament on the Queen's dress recalls his favourite style of surface decoration. Another point to be noted is that the engraved portrait of the Queen which appears in Jugge's Bishops' Bible of 1568 is in a roll-and-bead frame. Cole used the same ornament in his Greenwich dial, 1569, and later in a less obvious form in his B.M. dial, 1575. These resemblances in small points of detail are worth noting, for these early artists in metal still worked in a very limited field.

COLE AT THE MINT

We do not know when Cole first obtained employment at the Mint. According to his own statement he had been there for twenty years before 1578, which would make his arrival there contemporaneous with the accession of Queen Elizabeth. The official records of the Mint are incomplete for these years, so his name does not appear before 1572, when a grant, dated 18 April, appointing John Lonyson, citizen and goldsmith, to be master worker for life (Patent Rolls) defines the 'Fees and diett of the officers and mynisters of the Mynte to be borne by o' Souraigne Lady and Quene and to be paid by the Warden in the manner and some and during the term hereafter expressed'. The officers of the Mint at this time included a Warden, Assayer, Teller, Auditor, Clerk of Irons, Surveyor of the melting house, Clerk of the mynt, Graver, Sinker, Smith, Potmaker and Porter. The fees included

'The Gravor Dethick Anthony by yere	xxx <i>li</i> .
The Sinker Hymfrey Cole by yere	xx <i>li</i> .

Thes twoo offices to be but one after the death of Dethick and the fee to be then but xx *li*, and after Cole's decease the fee of xx *li* to cease.'

However, as things turned out, Anthony outlived Cole by many years, and George Tyson was 'Sincker of ye yrons' in 1610. The fees were not the only emoluments of the officers, for there was a 'diett' allowance of *liij li* in addition. But, even with this, Cole declared his stipend to be insufficient for the proper maintenance of his family, and doubtless tried to increase it by undertaking outside work as an engraver and instrument-maker: he may also have speculated in mineral ore. He certainly lived on in hope of advancement, for, as he says in a letter to Lord Treasurer Burghley,

¹ Colvin, *Early Engraving*, fig. 7.

'by your good meanes I was placed in the tower to serve the Quene in the mynte to doe the servyces perteyninge to the mill, that, when Eloy the ffrenchman shoulde be taken therefrom by death or otherwise, I should enjoye the same. And towarde my staie of livinge till that office shoulde fall, there was alowed unto me the ffee of the sincker of the stamper, being 20*l.* by yere; and he that nowe exerciseth that place hath not other thing to live on but the half of my ffee. And nowe he refuseth to serve in it anie longer, wherefore I humbly besech your honour to continewe my good lorde, that I maye be established in that house, office and ffee, which the said Eloy had, which I have staied for theis xxth yeres, and thereby spent the best of my tyme to my great hindraunce, lackinge sufficiente maintenaunce for me and my family. Albeit that I hoped by the service which I have donne and can doe, both in this respecte and in manie other thinges, if I were called thereto, to have obteigned some suche prefermente before this time, as that I should not nowe have bene destitute of livinge in this my olde age.

And there remayninge alwaies readie to serve the Quenes Majesty, and to die in hir service, I praie God that hir noble highnes maie have a longe lief, that I and manie other maie serve hir manie yeres, and your honnours health and prosperous estate maye longe contynewe.

From London this iijth of December 1578.

Your honor's moste humble suppliante

HUMFREY COLE.

This letter shows that Cole was closely connected with a most interesting episode in the history of the Mint. Burghley had advised the Queen to have all base money in circulation converted into sterling, an operation that was effected in a separate Mint in the Tower, and lasted about a year, from Michaelmas 1560 to Michaelmas 1561. The conversion was under the superintendence of Thos. Fleetwood, Under-Treasurer of the Mint; and a story is told that most of the workmen fell sick with the savour, and were advised to drink out of a dead man's skull for their cure. Accordingly a warrant was procured from the Council to take the heads from London Bridge, to make cups out of which the sick workers drank, and some found relief, although most of them died.

Perhaps the 'sickness' arose from fumes of arsenic with which the base metal was fluxed.¹ At the same time Eloy Mestrell, possibly a workman from the Paris Mint, was introduced to the Tower to install in England a new mill for coining, as a substitute for the hammer wielded by a moneyer. The innovation was made in 1561,² but as it did not find favour either with the moneyers or with some of the officers, it was discontinued in 1572.

Mestrell was apprehended in 1577 on a charge of making stamps for coining, and was condemned and executed at Norwich in the following year. This

¹ Ruding, *Annals of Coinage*, iii, p. 37.

² W. Hocking, 'Early History of Coinage by Machinery', *Numismatic Chronicle*, 1909, and H. Symonds, 'Mint of Queen Elizabeth', 1916.

doubtless was the occasion of Cole's petition to the Lord Treasurer. The excellence of the milled coins of Elizabeth is now generally acknowledged, and it is possible that Cole may be entitled to some share in the credit due to the work of Eloy Mestrell.

COLE'S CONNEXION WITH MINING

We first learn of Cole's connexion with mining in 1565, when William Humfrey wrote to Lord Cecil desiring that a commission for working mines may be in the names of himself, Christopher Shutz, Thomas Smyth, William Williams, and Humfrey Cole, and that the privilege of the battery works may be kept secret for eight months. Application was also made for a licence to dig for minerals and ores in England with power to impress workmen, waggons, and horses.¹ And again in 1577 and 1578 Cole's appointment as a Commissioner to test the ore brought back from the north-west by Frobisher, shows that he was regarded as an expert in such matters. The affair must have been one of the chief events of his life, and in any case the story, which involved the ruin of the wealthy London merchant Lok, will well bear repeating.

Captain Frobisher set out on his first voyage from London on 20th May 1576 to discover a north-west passage to Cathay. He returned to Harwich on 2nd October 1576, and to London on the 9th. When examined on oath concerning the passage to Cathay, he vouched 'absolutely with vehement words, speeches and oaths' that he had discovered the straits to Cathay, and had found good harbours for all the Queen's navy. On one island a black stone 'as great as a halfpenny loaf' was found; it was given to Lok, who had it tried, and it proved a mineral ore of a gold mine.

Public interest and cupidity alike were stimulated, and even the Queen herself headed the subscription list of the Adventurers with 1,000*l*.

A second expedition left London on 26th May 1577 and returned to Milford Haven on 20th September laden with rich ore worth 60*l* a ton, and, as Frobisher affirmed with great oaths, 'such plenty of precious stones, diamonds and rubies as he had discovered'. Jonas Schutz bore testimony as to assay value, but when scientific trials of the ore came to be made, John Broade and other goldsmiths of London could find no gold. Jonas's proceedings were suspected. A conference was held with Dr. Burcot [Dr. Burchard Kraurych] and a pension of 100*l*. a year was conferred on Jonas for life on condition that he made the ore worth 30*l* towards charges. A third trial was made. But Frobisher was not satisfied, and being a violent man, went to Tower Hill, where, 'finding Jonas naked at his works, and very sick, almost to death of

¹ Calendar of State Papers, Domestic, 15th Sept. 1565.

infection of the smoke of the minerals', he reviled him and drew his dagger on him, for without proof of gold his ships could not be prepared for a third voyage. Jonas retorted by solemnly vowing never more to go to sea with him.

There was then contention between Burcot and Jonas for the mastership of the great works, but in the end a pension of 100*l.* a year was granted to Burcot, and a patent to be chief work-master. A drawing of Burcot's works for the smelting of the ore is preserved in the Record Office; it is annotated by Lord Burghley, who had doubtless made a careful inspection, when the falsity of Burcot was alleged by Robert Denham, who was granted a pension of 50*l.* a year. At this stage Humphrey Cole was called in with Sir William Wynter, Humphrey Lock, Frobisher, Edmund Hogan, Richard Yonge, John Dee, Andrew Palmer, and John Broade. They made further trials which were finished on 20th February and 6th March 1578. The ore was found to be worth at least 24 *li* a ton towards the charges, and was so certified to the Privy Council by the Commissioners on 8th March.¹

March 8, 1578. 91. Account taken at Muscovy House of 2 cwt. of ore brought by Mr. Frobisher, molten and tried by Jonas Schutz an Almain, assisted by Humphrey Cole, John Brode, and Robert Denham, Englishmen. The 2 cwt. yielded in silver 6 oz. 7 dwt. 13 gr. valued at 5*s.* per oz. ; in gold 5 dwt. 5 gr. valued at 3*s.* the dwt., so that a ton will make in money 23*l.* 15*s.* The charges of getting the ore into the realm, as by particulars delivered by Mr. Frobisher, will not exceed 8*l.* per ton. Jonas undertakes not to expend for all charges above 10*l.* 15*s.*, which will leave a profit on every 100*l.* adventure of 60*l.* Signed by Sir Wm. Wynter, Edward Dyar, Martin Frobisher, Rich. Yonge, Mathew Fyeld, Edmond Hogan, Michael Lok, and Andrew Palmer. [In another copy 'John Dee' signs the account. B.M. MS. Lansdowne xxxi, fol. 77.]

Frobisher sailed from London in May following, and after a quick voyage discharged at Dartford in October 1578 a large cargo of ore said to be worth 60*l.* to 80*l.* a ton. Jonas sent for skilled workmen from Saxony, and a commission was appointed on 29th October, but the trials of the ore 'proved very evil'. Cole's name is not mentioned. Further trials were ordered, and the ore proved utterly worthless. The company of the Adventurers lost 10,000*l.*

In the light of this failure Cole and his fellow commissioners do not seem to have been skilful metallurgists, but nevertheless he appears to have continued to enjoy the confidence of the Lord High Treasurer as a prospector, and in the summer or autumn of 1578 he journeyed to Yorkshire to seek for metal mines. His report is dated 4th December 1578.

¹ State Papers, Colonial, East Indies, 1513-1616, no. 91.

Righte Honourable,—

Whereas Mr. Edwarde Dyer presented to your honour a peece of greene owre which he had of me, yt was your honour's pleasure that I should make serche for it at my goinge into the northe, which I accomplished according to your honnour's appointement, and have brought some of it with me from the place where it was gotten; the whiche I woulde have presented to your honnour longe before this tyme, but for that I dwell in London, I durst not presume to come to the courte unto you. Wherefore I have nowe sente the same unto your honnours by Mr. Walter, one of your gentlemen, certefienge your honnour that it was founde in the digging of a quarry in the ground of Mr. Robert Bowes of Aske in the Countie of Richemonde, soe neere unto his house there (upon the which he is nowe bestowinge greate coste in buildinges) that in the digging for the same owre his howse may be undermined. Howbeit there be other places thereabout where in the same owre, or the like, in good plentie might be serched and founde; for there was plentie of it in that place where I had this, but I perceave the said gentleman dare not digge for it, for that he feareth thereby to undermyne and hurte the foundation of his said house, and it appeareth that in old tyme there hath bene within a quarter of a mile of the same place greate woorkinge, but noe man to this day knoweth to what purpose. Onelie this I heare, that there was an olde recorde found mencioninge that those hilles thereaboutes were called riche mounts or *divites montes*, whereof the towne of Richmond took the name and was called Richmounts. And thus I am bolde to declare the reporte thereof to your honnour, as yt was tolde unto me; and I doubte not to discover manie profitable thinges bothe there and in other places in that countrey, if I had occasion to remaine thereabout. And if it please your honnour to use my service in this or anie other thinges according to my skill, I am at youre honnors comaundement, havinge founde you my good lord at all times.

The letter then continues with the passage already quoted on p. 311.

We have no further information as to Cole's connexion with minerals, and it is not unlikely that when the worthlessness of Frobisher's North-west ore was finally proved, the denouement brought financial embarrassment to Cole, as well as to Lok and others who had been concerned in the venture.

HUMPHREY COLE'S CIRCLE

The names of a few of Cole's brother craftsmen who were following their trade about 1580-90 are noted by Edward Worsop, Londoner, in a work entitled *A Discoverie of sundrie errours and faults daily committed by Lande-meaters ignorant of Arithmetike and Geometrie*, 1582. In an advertisement the reader is reminded that

Scales, compasses, and sundry sorts of Geometricall instruments in metall, are to be had in the house of Humfrey Cole, neere unto the North dore of Paules, and at the house of John Bull at the Exchange Gate: in wood, at John Reades in Hosier Lane, at

James Lockersons dwelling neere the Conduite at Dowe gate, and at John Reynolds at Tower Hill. . . . I have thought good to give advertisement hereof, because many that would provide such things, knowe not where to have them.

In a contemporary note by Gabriel Harvey in his copy of Blagrave's *Mathematical Jewel*, in the British Museum, another maker, James Kynuyn 'of London, neere Powles', and therefore a near neighbour of Cole's, is described as 'a fine workman and mie kinde frend: first comended unto me bie M. Digges and M. Blagrave himself. Both He and old Humfrie Cole mie mathematical mechanicians have not been so highly praised as several meaner artificers.' An example of Kynuyn's work, a dial made in 1593 for Robert Devereux, earl of Essex, has been described in *Archaeologia*, vol. xl. The dates of his instruments show him to have been junior to Cole, whose traditions he may have carried on, and to whose business he may indeed have succeeded. Harvey's epithet 'old Cole' suggests a disparity of years.

We regret to record that, like many another eminent member of his craft, Cole died in reduced circumstances. He left no will. Administration was granted to Elizabeth Cole, his widow, on 6th July 1591.

Sexto die emanavit commissio Elizabethae Cole relictæ Hymfridi Cole nuper parochie Sti Gregorii prope ecclesia Cath. Divi Pauli London defuncti pro administrando bona, jura et credita eiusdem defuncti in persona Thome Warde notarij publici procuratoris sui et Jurati.

On 30th March 1593 an entry in the parish register of St. Dominic in East Cornwall records the burial of an Elizabeth Coles, widow of Humfrye Coles esquier, but there is no evidence to show that she was the widow of Humphrey Cole of London.

APPENDIX

Bill for Maps and Nautical Instruments purchased by Captain Frobisher for his first voyage of discovery to the North-west in 1576.¹

	£	s.	d.
Paid for a book of cosmographie in French of Andreas Thevet	2	4	0
Paid to Humphry Cole and others—			
For a great globe of metal in blanke in a case	7	13	4
For a great instrument of brasse named <i>Armillæ Tolomei</i> or <i>Hemispermum</i>	4	6	8
For an instrument of brasse named <i>Sphæra Nautica</i>	4	6	8
For a great instrument of brasse named <i>Compassum Meridianum</i>	4	6	8
For a great instrument of brasse named <i>Homometrum Geometricum</i>	4	0	0
For a great instrument of brasse named <i>Horologium Universale</i>	2	6	8
For a ringe of brasse named <i>Annulus Astronomicus</i>	1	10	0
For a little standing level of brasse	0	6	8
For an instrument of wood a stafe named <i>Balestetta</i>	0	13	4
For a very great carte of navigation	5	0	0

¹ Published by the Commissioners on Public Records, 1837.

	£.	s.	d.
For a great mappe universall of Mercator in prente ¹	1	6	8
For three other small mappes prented	0	6	8
For 6 cartes of navigation written in blacke parchment whereof 4 ruled playne and 2 rounde	2	0	0
For a Bible Englishe great volume ²	1	0	0
For a cosmographical glasse ³ & castell knowlege ⁴	0	10	0
For a new World of Andreas Thevet Englishe & French ⁵	0	6	8
For a Regiment of Medena (Spanishe) ⁶	0	3	4
For Sir John Mandeville (Englishe)	0	1	0
For 20 compasses of divers sorts	3	3	0
For 18 hower glasses ⁷	0	17	0
For a <i>astrolabium</i>	3	10	0

The 'Summe of all the said charges of furnytüre of the shippes outwardes' includes the item 50*l.* 14*s.* 'for Instrumentes of navigatione'.

DISCUSSION

Prof. CALLANDER wished to correct the impression that the juxtaposition of compass-points and harbours on the Greenwich dial was arbitrary or even magical. Once the position of the moon was known, it was clear from John Davis's *The Seaman's Secrets* (1595) that the problem was easy, and it was a mistake to suppose that the work of Elizabethan seamen was based on the astrolabe. Frobisher was a failure, and his successors were mostly treasure-hunters. At first reliance was placed on the astrolabe, but Davis was hardly concerned with astronomy, and preferred the back-staff or quadrant, which was an improvement on the cross-staff. The astrolabe, derived from the Moors and Spaniards, was found to be useless and continued to be made only as a toy.

¹ Possibly the *Globi terrestris sculptura* of Gerard Mercator. Louvain, 1552.

² Possibly Richard Jugge's Bishops' Bible of 1572.

³ Cuningham, *Cosmographical Glasse* 1559.

⁴ R. Recorde, *Castle of Knowledge* 1556.

⁵ Andrew Thevet, *The New found worlde, or Antarchike . . . travailed and written in the French tong.* English translation 1568.

⁶ Pedro de Medina, *Regimento de navegacion, contiene las cosas que los piletos ha de saber para bien navegar.* Seville, 1563.

⁷ Numerous hour-glasses were a necessary part of the equipment of every well-appointed ship of the period. They were used for timing the length of watches, for estimating the distance sailed and thus for deducing the longitude. Several were turned simultaneously so as to insure against the risk of the stoppage of the sand in a single glass. The Dutch used them set in frames in groups of four. 'A [printed] Survey-Book containing all the Rigging . . . Furniture and Stores belonging to his Majesties ships' the *Royal James*, the *Royal Katherine* and *Harwich*, No. 2265, in the Pepysian Library, has the following entries:

Boatswain his Sea store

		<i>Royal James</i>	<i>R. Katherine</i>	<i>Harwich</i>
Compasses		18	12	10
Glasses	Watch	1	1	1
	Watch	—	1	1
	Hour	18	16	10
	Minute	8	6	4

Mr. DALTON thought that such instruments, of which Britain had perhaps the best series in the world, deserved more attention than they generally received. Mr. Lewis Evans's collection was worthily housed at Oxford, mainly owing to Dr. Gunther, and supplemented the exhibits at the British Museum and the Science Museum. America would no doubt compete for the possession of any others that came to light.

Mr. HINKS disclaimed any knowledge of astrolabes, but had been deeply interested in the account of instruments made about the same time as those of Tycho Brahe. He thought museum authorities paid more attention to the craftsmanship than to the purpose of the astrolabes. The method was to hold the instrument up to the sun or stars, but he failed to see how one weighing 40 lb. could be so used, as the wind would interfere with observations. The copper-plate engraving on exhibition, said to be the first in England, was later than the edition of Ptolemy published abroad about 1480-5. It would be interesting to test the accuracy of the engraving with a measuring machine. Dr. Gunther identified places with some confidence by their latitudes, but Gilbert Norwood, about 1580, showed that the supposed latitude of Edinburgh was wrong by a degree. He added that an instrument sent to the Royal Geographical Society on permanent loan was at the present time in a collection at Oxford.

Sir WILLIAM LAWRENCE said the paper had involved a good deal of research and congratulated the author on getting things done, and especially on securing the Evans collection. He had been asked by Col. Croft Lyons, whose health prevented his attendance at the meeting, to bring two exhibits—an Arab astrolabe of the sixteenth century with its original case, and an early English specimen between 1400 and 1450, with an inscription showing that it had belonged to John Thorne and represented the world in plan 'thanks to the wise science of Ptolemy'. That was perhaps an attack on the rival system. He had taken that instrument to the Admiralty and found there a navigating lieutenant who said he would have no difficulty in navigating with it.

The PRESIDENT was gratified to note the survival of the Frobisher spirit at the Admiralty, and tendered the thanks of the Society to Dr. Gunther for an interesting paper. He too wondered what would be the value of such instruments apart from their exquisite craftsmanship. The Evans collection at Oxford was an object lesson in metallurgical skill, and it was important to have a reconstruction of the life and works of Humphrey Cole, who, apart from his contributions to science, would rank high among British craftsmen.

Dr. GUNTHER, in reply, said he had once concluded from woodcuts that the instruments used by Leonard Digges and his contemporaries were of rough workmanship, but many of them were probably as good as those made by Humphrey Cole. The valuable instrument mentioned by Mr. Hinks was in his own possession, though exhibited with the Evans collection. The degree of accuracy ought certainly to be determined, and he agreed that it would be difficult to use such planispheric astrolabes on board ship. The instrument used by navigators was a skeleton-model known as the mariner's astrolabe, made heavy and with large apertures to lessen its resistance to the wind.

* * Blundevile described the dimensions and use of the mariner's astrolabe as follows:
'broade astrolabes, though they bee thereby the truer, yet for that they are subject to the force of the wind, and thereby ever mooving and unstable, are nothing meete to take the Altitude of anything, and especially upon the sea; which this to avoide, the Spaniards doe comonly make their Astrolabes or Rings narrow and weightie, which for the most part are not much above 5 inchs broad, and yet do weigh at the least four pound, and to that end the lower part is made a great deale thicker than the upper part towards the Ring or handle. Notwithstanding, most of our English Pilots that be skilful, doe make their Sea Astrolabes or Rings sixe or seven inches broad, and therewith very massive and heavy, not easie to be moved with everie wind.'

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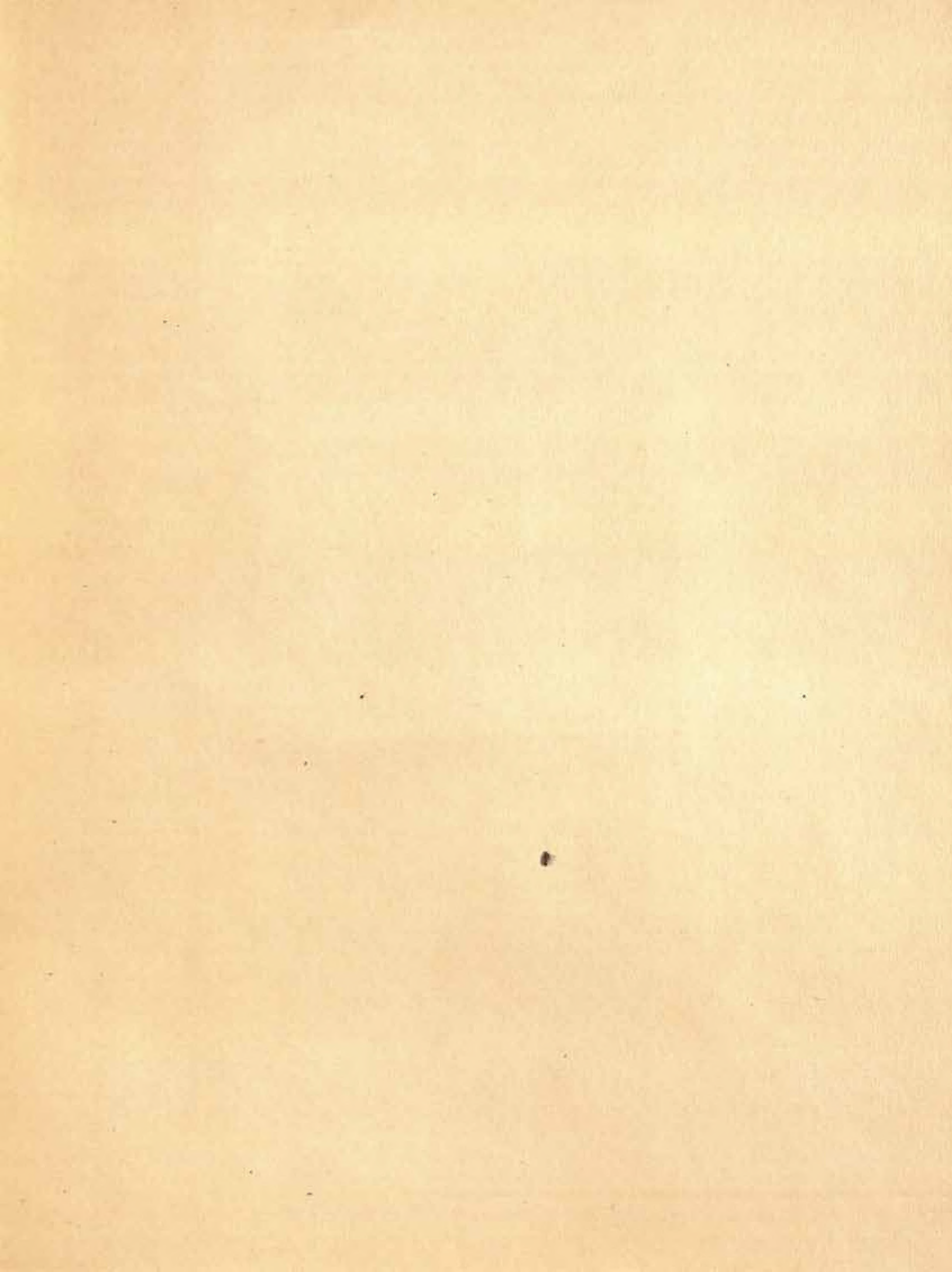
Y

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